



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

किर IITH

the crowning glory

A quarterly newsletter of IITH



As the world strives to fight against COVID-19. IITH brings through this issue, how it is Harboursing Healthcare with some of its Path-breaking Researches.

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Dear Readers,

We hope you are doing well.

First of all, we sincerely thank all our readers for acknowledging and honoring our efforts for the past three issues. Your valuable suggestions have helped us improve, and we hope that किराIITH Issue-4 reflects the same. Health has always been the most important facet of our life, and Covid-19 has re-iterated the fact once again.

The development of Healthcare is thus of prime importance to humanity. Research @IITH is trying to uncover new theories, inventions that will help in the advancement of Healthcare, thereby contributing to humankind's improvement in its own unique way.

Hence, we thought it was relevant to dedicate this entire issue to the research undertaken at IITH in nurturing Healthcare and named this issue, किराIITH The Crowning Glory #HarbouringHealthcare.

We hope this edition gives you a good idea of the prominent research and Initiatives taken in IITH and encourage us to keep on delivering the latest issues of किराIITH - The Crowning Glory.

We wish everyone a safe and healthy stay.

Have a good read!



Prof. C. Krishna Mohan
(Dean – Corporate & Public Relations)
{Editor-in-Chief}



Prof. Deepak John Mathew
(HoD - Design)



Mrs. Mitalee Agrawal
(Public Relations Officer)



Mr. Ujjwal Dasari
(Media & PR Secretary,
Student Gymkhana)



Prof. B. S. Murty
Director, IIT Hyderabad

Invent and Innovate in Technology for Humanity – IITH

Dear friends,

IIT Hyderabad has again demonstrated that it is leading engineering institute in the country with NIRF Ranking #8 and QS World Ranking (India) #10. We stand ahead in our league because of dedicated faculty, brilliant students and committed staff. We define IITH as Invent and Innovate in Technology for Humanity. This commitment and our strong team have made IITH to sail through the difficult times when COVID-19 hit the whole world early this year.

Strong research foundation at IITH has resulted in an exhibition of extraordinary work to combat COVID-19 like Test Kits, Masks, Ventilators, Mathematical Models, psychological Models, apps, sanitizing solutions and technology for social good, which includes creating awareness and supporting neighboring villages adopted by IITH under Unnat Bharat Abhiyan.

We have commenced BTech in Biomedical Engineering effective from this year with decent starting ranks of IIT-JEE Advanced along with several new industry-oriented MTech programs, such as Additive Manufacturing, Energy Science and Technology, E-Waste Resource Engineering and Management, Integrated Sensor Systems, Networks and Information Security, Polymers and Bio-Systems Engineering and Smart Mobility.

IITH has also continued to excel in the other fields of research such as, Super-capacitors, Batteries, Neem-oil based storage bags for seed storage, Novel Molecules to treat ALS and Combination Therapy for Cancer, etc.

IITH has excellent entrepreneurship base with a strong incubation activity. Entrepreneurship ecosystem at IITH had many success stories in the past. Ventilators, Masks and Face shields are few of the works done by our start-ups during this tough and testing times of COVID-19.

It is a matter of immense pride that one of our PhD scholars along with his colleagues has developed an Air Sterilizer 'Swatchh Air' to treat COVID-19 Virus and has been awarded as Top-10 Start-up Products in the recent HYSEA 2020, nurtured under an IITH in-house student research support program called BUILD (Bold and Unique Ideas Leading to Development). IITH has also started supporting interdisciplinary projects and rural development projects of its faculty through internal funding.

Our international relations have crossed an important milestone with the first Joint PhD student between Swinburne and IITH successfully defending his thesis recently.

We had a phenomenal year with remarkable academic and industry collaboration with top-notch institutes like the University of Hyderabad in India and Hiroshima University in Japan and many organizations like OPPO, IBM, CDAC, NHAH in India and DENSO & NFCM in Japan. I am sure this will enable us to establish newer benchmarks in research and technology and be the dream destination for students, faculty, researchers, and industrialists.

We have started bringing out किरIITH on specific subject right from Issue-2 on COVID-19 and Issue-3 on Artificial Intelligence reflecting the great work by IITH Team. This Issue-4 focuses on the research being carried out in the field of Healthcare by the faculty and students of IITH.

I hope that in 2021, we will be able to curb COVID-19 soon and that the campus will become lively soon with all its students.

Wishing you a wonderful year ahead.

Stay Safe & Stay Smart!

Prof. B. S. Murty, IIT Hyderabad

Unfolding the capabilities in the young minds

Greetings to all. Hope, you all are doing well. We@IITH are passing through the most difficult time in terms of academic affairs due to current pandemic situations. Semester duration has been reduced to ~3.5 months than usual ~4-month semester. Two semesters are running in parallel. UG 1st Year has started in Nov' 20 along with Sept' 20 semester for all other batches. This pandemic has forced us to have new exposure to online academics. There are several burning issues like laptop availability for students, internet issues in many remote places and other pandemic related pressures on each one of us etc.

The student population has also increased. Currently, we have ~3300+ students. As we have fractal academics (0.5 to 3 credit courses), IITH is naturally having a large number of online courses. In this testing time, IITH has put forward a strong attempt to continue its journey without any compromise in the academic processes and standards. We are soon going to upgrade ourselves to ERP software solutions for better academic as well as institute governance. To help students in this distressful situation, we have enabled 'Bank Loans' for students to buy Laptops (for UGs, IITH will pay the interest).

IITH is proud to say that the 1st Joint IITH-Swinburne PhD student has been graduated under the collaborative program. We have enrolled 14 foreign nationals as students in Sept' 20, compared to 1 in 2019. We are hopeful that this number will increase in future. Even in this pandemic time, the academics of

IITH has made steady progress. Nearly 80+ scholars are expected to complete their PhD. Viva-voce in between 15th March 2020 to 31st Dec 2020. In terms of academic collaborations, our Senate has approved 2 MOUs; one with IIT Madras & the other with Hyderabad Central University. While the first 10 years gave us a rock-solid foundation, now it is the time to think for long term visions. Academic Advisory Committee (AAC) has started functioning very recently to establish long term policies for the academic affairs @IITH.

To give more focus on UG/PG courses and curriculums, Senate UG & PG Committees have started working in the last few months. For a smoother online experience, we have explored several online platforms to standardize online academics. New methodologies like flip teaching are already being adopted to conduct the courses with mid to large size classes with the help of our Computer Center. IITH is young and has dreams to place itself very high in the academic galaxy. We are student-centric and faculty-driven. The objective is to unfold the capabilities in the young minds to do wonders for the greater welfare of the society at large.



Dean (Academic)
Prof. Saptarshi Majumdar

Medical Biotechnology Research in the Department of Biotechnology, IITH

Dr. Basant Kumar Patel's laboratory focusses on understanding the mechanism of protein mis-folding. Protein mis-folding is an aberrant process that occurs due to several factors such as a genetic predisposition. Several diseases have protein mis-folding as one of the causative factors. His laboratory works on certain proteins implicated in the pathogenesis of renal amyloidosis disease (publication: Vishwanath et al., *Biochimie*, 2016) and amyotrophic lateral sclerosis disease (publication: Archana et al., *Frontiers in Molecular Neuroscience*, 2019). Dr Patel's lab is now engaged in the research in better understanding of the molecular mechanisms of these diseases.

Dr Ashish Misra's lab is involved in the development of intrinsic and acquired resistance to well-known anti-cancer drugs represent a major impediment to effective cancer therapy. There is an unmet and urgent clinical need for the development of new therapies targeting the drug-resistant tumours and primary goal of his lab is to identify genes and mechanisms underlying therapeutic resistance to known anti-cancer drugs. Therapy against various drug-resistant tumours will be more effective if compensating pathways that lead to drug resistance are defined, predicted by biomarkers, and targeted. In the long-term, his research aims at providing new, innovative and clinically actionable solutions for the treatment of drug-resistance cancers.

Dr Anamika Bhargava's lab is interested in identifying novel targets in triple-negative breast cancer. Currently, the lab is investigating the role of voltage-gated calcium channels in triple-negative breast cancer and whether they can be targets in triple-negative breast cancer. Voltage-gated calcium channels are highly druggable and

have been targets in other diseases including cardiovascular disorders and disorders of the nervous system. In many cancers including triple-negative breast cancer, voltage-gated calcium channels are overexpressed but whether we can modulate them to suppress cancer remains debated. Another interesting area that Dr Bhargava's lab targets are the mechanisms of toxicities caused by chemicals of widespread use such as preservatives, pollutants and pesticides. Direct or indirect exposure to the contaminated environment may alter the biochemical and/or physiological processes of an organism at the tissue or cellular level and therefore it's important that the effect of these chemicals on living organisms is investigated. Recently Dr Bhargava's lab probed the mechanism of action of Glyphosate (the most common, broad-spectrum herbicide) and for the first time, we showed that it can affect calcium and nitric oxide signaling in the heart (Publication: Gaur et al, *Biochemical and Biophysical Research Communications*, 2019). Her lab continues to investigate the detailed mechanisms of toxicities and other disease mechanisms using a combination of several techniques such as molecular biology, biochemistry, fluorescence assays and electrophysiology in in-vitro and in vivo models.

Dr Rajakumara Eerappa's lab is involved in research related to structural Biology, X-ray Crystallography, Epigenetic and DNA repair, Protein/enzyme engineering for application in the organic or pharmaceutical industry and Structure-based drug design. Her lab also investigates the detailed mechanisms of Bacterial glycobiology.

Continued...

Dr Thenmalarchelvi Rathinavelan's lab is involved in research related to understanding the physical principles behind the biological phenomena by employing computational, biochemical and structural techniques.

Dr N. K. Raghavendra's lab Innate Immunity, cancer, HIV. The lab studies DNA-protein and protein-protein interactions that occur during the innate immune response to cancer and viral infection.

My laboratory (Dr Anindya Roy) studies the molecular biology of DNA. Genetic information is stored in a molecule known as DNA. However, many harmful chemicals alter the nature of the DNA. Interestingly, such chemicals are also

commonly used as anticancer drugs. There are proteins inside every cell that protect DNA from such damage by a repair process. Thus, DNA repair has enormous implication in our wellbeing. It is very difficult to know the presence of most of the DNA damages in the DNA. In a recent project funded by Department of Biotechnology, Government of India, we developed and imaging technology using fluorescent probes to know precisely where the DNA is damaged (publication: Monisha et al., Nucleic Acid Research, 2019). Currently we are developing this method further to understand how fast these damages are removed from the DNA.



Prof. Anindya Roy
HoD - Biotechnology

Message from the Head, Department of Biomedical Engineering

In this year 2020, the global pandemic of COVID-19 marked a new era in healthcare delivery in India. While praising the efforts for frontline workers, it was clearly evident that the guarantee of a proper health system is not the sole responsibility of medical professionals or doctors, but a combined effort of all of us, who either provides, manages, or maintains the healthcare system. There appears to be equal responsibility not only by doctors and nurses at one end but also by the consumers of healthcare as every individual. Educating everyone about a pandemic was utmost importance at the beginning in a lock-down state, where a mask was added to the normal wardrobe of any person or handwashing was an added ritual every time we visit outside.

With this unique problem, we have understood 3 things for our country. First, healthcare-related inventions need due importance compared to any other field and it needs to happen locally where it intends to serve for humankind. Second, in India the majority of the biomedical products are still imported from abroad though our market has huge potential. Third, normal Indian persons, in general, think imported products are of better quality than Indian made products when it comes to healthcare needs.

Of course, these sentences cannot be generalized, and we still need to have lots of debate in a different context. However, this is high time we must tackle the situation nicely to avoid our future dependency on others. Therefore, the government started many concepts like “Make in India”, “Atmanirbhar India” and so on. Ultimately, it is not the Govt., but it is our responsibility to make it happen in India. To address the important issue, at IITH in a combined effort, many important decisions were

taken. First, a new BTech in Biomedical Engineering at IIT level started for the first time at IITH in India. The sole responsibility is to make the human resources to directly address the biomedical problems. Second, for the last few years, the Center of Healthcare Entrepreneurship (CfHE) at IITH has shown an array of indigenous innovations for Indian healthcare needs which makes a global presence with many awards and accolades. It was further strengthened by introducing MTech in Medical Device Innovation at IITH. Third, several projects and courses were started with direct collaboration with the renowned hospitals in Hyderabad. Students are required to visit hospitals and learn about medical physiology as if they were in a medical school to foresee and lead future innovations.

To conclude, as a community we need to bridge the diverse cultures or departments and merge them in a welcome manner to make the biomedical innovations. The biomedical innovations require a strong “We” approach than “I” approach of various subject areas coming together. The current issue of KirIITH focusses the tip of the iceberg innovations already happened, while a number of ideas are generated at IITH community. As a department head, I would like to request all readers to think and debate how can each of them contribute to the noble cause for a better and healthy future of India.

Jai Hind!!

Dr. Subha Narayan Rath
Associate Professor
HoD - Biomedical Engineering



Antimicrobial agents in consumer products: Dark side of Triclosan

Microorganisms tend to degrade and decrease the shelf life of many consumer products such as hand lotions, mouthwashes, toothpaste etc. To increase the shelf life of consumer products, antimicrobial chemicals are frequently added to stop the growth of unwanted microorganisms. One such chemical is Triclosan (5-chloro-2-(2,4-dichloro phenoxy) phenol), which is frequently added to the consumer products available in India and worldwide such as soaps, toothpaste, deodorants etc. Now one can find triclosan even in the kitchenware and clothes, although, its initial use in the 1960s was restricted to medical care products. In very low amounts, triclosan may be well tolerated by humans, but given the widespread use of triclosan in personal care products, it is getting bioaccumulated in human tissues and organs (Geens et al., 2012).

An emerging public health concern points out that unregulated and extensive use of triclosan may lead to proliferation or emergence of harmful microorganisms that are resistant to clinically proven antibiotics (Carey and McNamara, 2015). Recent studies have found that environmentally relevant concentrations of triclosan can affect many developmental processes (Wirt et al., 2018). However, our understanding of the molecular targets and mechanisms of triclosan induced toxicity is very limited. In the absence of scientific mechanistic data, it is nearly impossible to propose a ban or restriction on the use of such chemicals. Over the last few years, we got interested in understanding the mechanisms of toxicity / adverse effects caused by chemicals such as triclosan. To understand the mechanisms of toxicity in our lab, we use an excellent, versatile vertebrate animal model, the Zebrafish. Zebrafish is a well-validated model for toxicity

research, results from which have been reliably extrapolated to humans. Using a combination of molecular biology, biochemistry and behaviour analysis tools, we observed that triclosan even at sublethal concentrations can induce potent neurotoxic effects. We have recently published our results in Chemosphere (Pullaguri et al., 2020). In our study, prolonged exposure (up to 4 days) of 0.6 mg/L (50% Lethal concentration, LC50, 96 h) and 0.3 mg/L (<LC50, Sublethal) triclosan produced aberrations in motor neuron innervations (loss of structural integrity of motor neurons) in skeletal muscles and reduced touch-evoked escape response in zebrafish larvae. Touch-evoked escape response is a behavioural assay to assess locomotor behaviour. Locomotor behaviour in zebrafish is primarily regulated by the activity and integrity of motor neurons, therefore the results of this assay can be used to assess motor function. Along with other genes that are involved in synaptic transmission, the ache gene was downregulated upon exposure to triclosan.

The ache gene encodes for acetylcholinesterase enzyme that catalyzes the breakdown of the neurotransmitter acetylcholine at neuronal and neuromuscular junctions. Together with other results, our data support the hypothesis that even sublethal triclosan concentrations are potent enough to interfere with the motor neuron structure and function. The potential underlying mechanisms include down-regulation of genes involved in synaptic transmission and direct inhibition of acetylcholinesterase enzyme (see figure). Our study suggests caution in the use of triclosan based products and perhaps it's time that triclosan use in India is restricted or banned?

Continued...

**(Arranged in the alphabetical order of author's name)*

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environmentally relevant concentrations of triclosan impairs foraging efficiency in zebrafish larvae: Triclosan impairs foraging efficiency in zebrafish larvae. *Environmental Toxicology and Chemistry* 37, 3124–3133.

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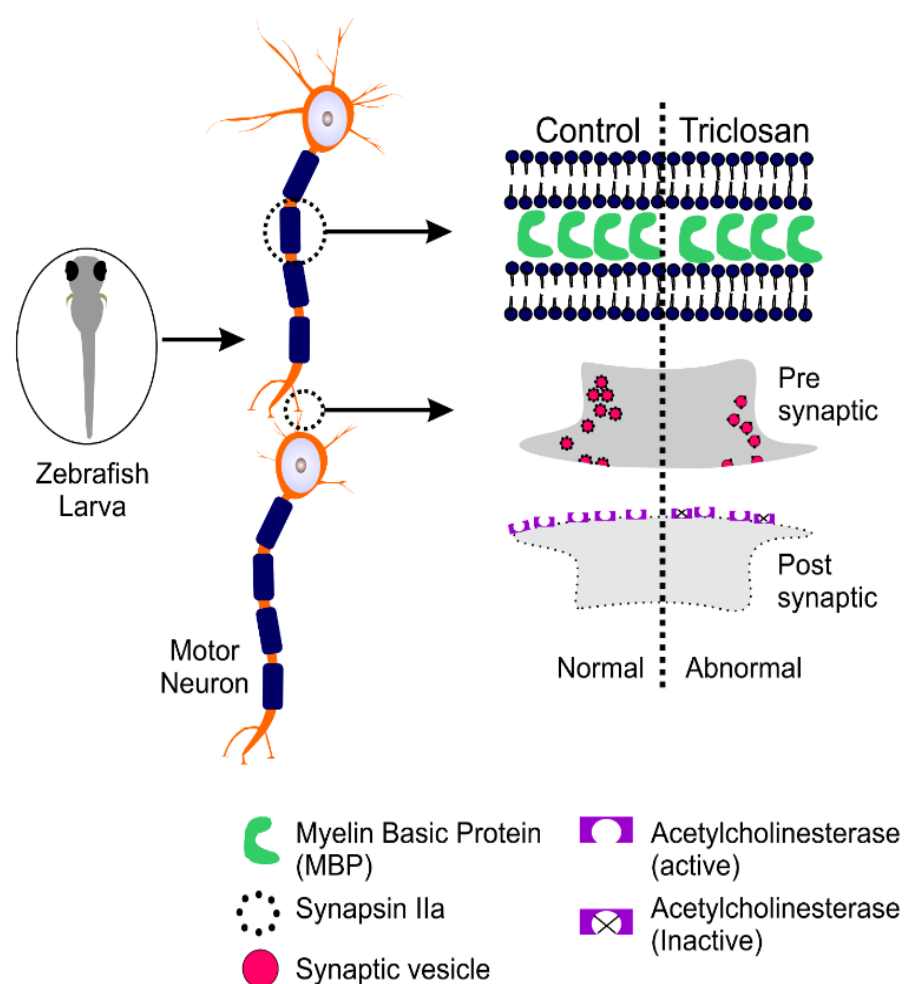


Figure 1: Potential mechanisms of triclosan induced neurotoxicity in developing zebrafish embryos. Downregulation of ache gene and inhibition of acetylcholinesterase enzyme activity may result in the abnormal cholinergic transmission caused by aberrant signaling mediated through acetylcholine receptors. Downregulation of synapsin IIa gene may result in the interference in vesicle trafficking at the presynaptic terminals. Overall, this aberrant neuronal signaling may have resulted in the abnormal motor function in zebrafish larvae. Figure reproduced from Pullaguri et al., 2020.



Dr. Anamika Bhargava
Department of Biotechnology

P-NAS Lab IITH- Dept. of BME

(PI : Aravind K Rengan; Students: Tejaswini & Sushma)

Cervical cancer is one of the leading causes of cancer-related death in women globally. Cervical cancer has a long pre-clinical phase without any symptoms and can only be diagnosed with rapid screening. The current procedures like Pap smear, biopsy, HPV gene testing are expensive, requires multiple medical appointments and are not very comfortable affecting the frequency of screening. We have developed “C-ColAur” technique as an affordable alternative. This is a colorimetric technique for the screening of cervical cancer using the in-situ formation of gold nanoparticles. This technique differentiates the cancerous and healthy samples by a simple change in colour. In this technique, gold nanoparticles formed in the presence of cervical-vaginal fluid showed colour (blue/ colourless) specific to the clinical sample (healthy/cancerous). This difference in

colour respective to the sample was due to the size of the gold nanoparticles formed. Gold nanoparticles formed with healthy sample (Control) were 15-20 nm in size while nanoparticles formed with cancerous sample (Test) were 250-300nm in size. This difference in the size of the nanoparticles resulted in different colours allowing the detection of the cancerous sample. This technique neither requires pre-processing of the sample nor needs any equipment or medical expertise for analysis. We have validated the technique using 62 samples collected from healthy and cancer affected women and compared it with the conventional screening procedures like Pap smear and biopsy. “C-ColAur” showed a diagnostic sensitivity of 96% and can also be used as a prognostic indicator. This technique with read-out time less than a minute can be used for clinical or point-of-care applications.”

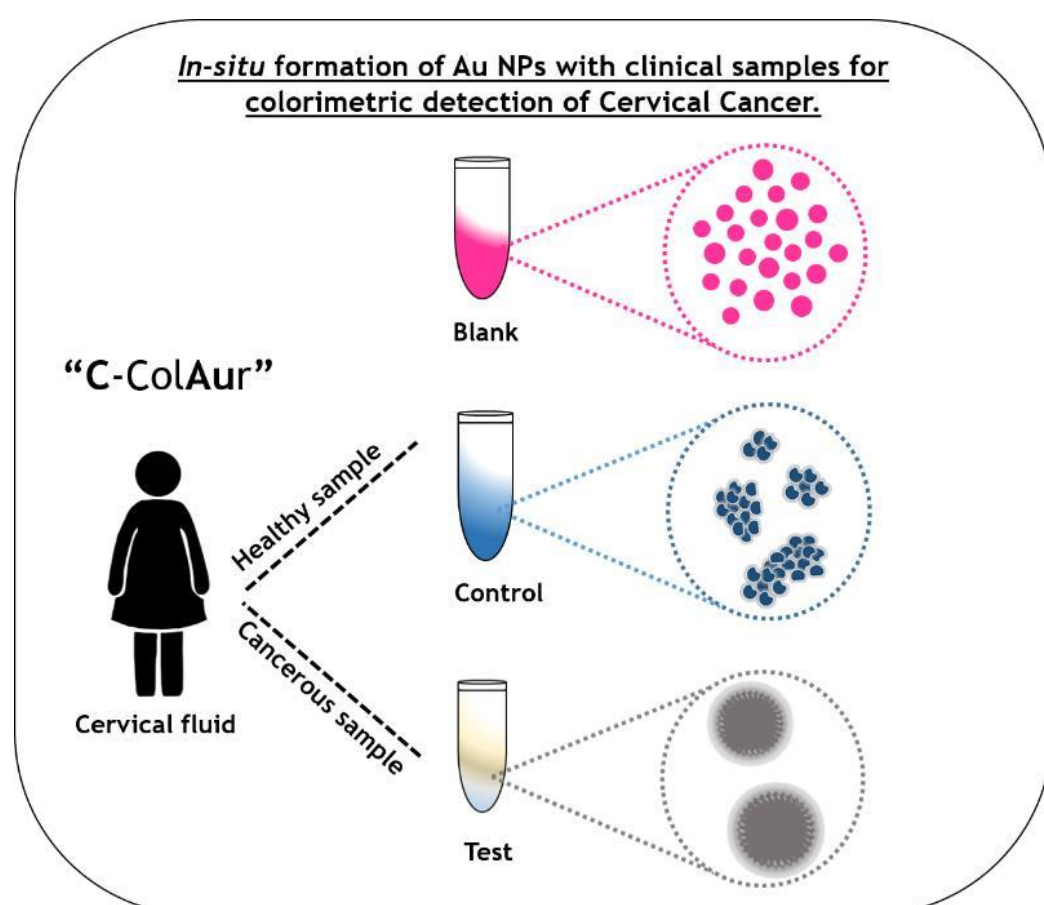


Figure 2: Schematic showing the colorimetric detection of cervical cancer using “C-ColAur” technique

Link: <https://pubs.rsc.org/is/content/articlepdf/2020/na/d0na00686f?page=search>

Dr. Aravind Kumar Rengan
Department of Biomedical
Engineering



Smart and Noninvasive Combinational Therapies for Cancer

Cancer is the second-most-common cause of death in the world. This disease overall kills more than 8 million people each year. It is expected that this statistic will increase by about 50% in the next few decades. 'Cancer' is an umbrella term used for diseases characterized by uncontrolled, autonomous growth of cells in any tissue. Most often times, there is not a single factor that leads to this disease, but generally are either inherent (unavoidable genetic changes), or acquired (ionizing radiation, chemical carcinogens, lack of exercise, imbalance in nutrients, hormones, growth factors, etc.). Over the years, several therapies (including radiotherapy, which could lead to genetic alterations by itself) have been used to treat cancer, but few have succeeded, often temporarily. Immunotherapy for cancer has recently shown promise in therapy, by taking the brakes off the body's natural response towards tumour control, and help lead to a cure. The recent clinical success of immunotherapy highlighted by a 2018 Nobel-prize awarded to James Allison and Tasuku Honjo, who discovered immune checkpoints, and subsequently its therapeutic angle. Although revolutionary, this therapy, unfortunately, fails as a monotherapy (immunotherapy by itself as a therapy) in most cancer types and is quite expensive, and patients often suffer from side-effects. Local noninvasive therapies along with immunotherapy could help turn off the tumour's defences effectively, and render them defenceless, longer. This combinational attack strategy seems to also work well in cancers that are otherwise stubborn. Ultrasound-based high intensity focused ultrasound (HIFU) is an

exciting and innovative technology that is noninvasive and nonionizing, and capable of killing tumour cells or breaking them apart with no need for an incision, and does not damage tissue between the tumour and skin (Fig. 3).

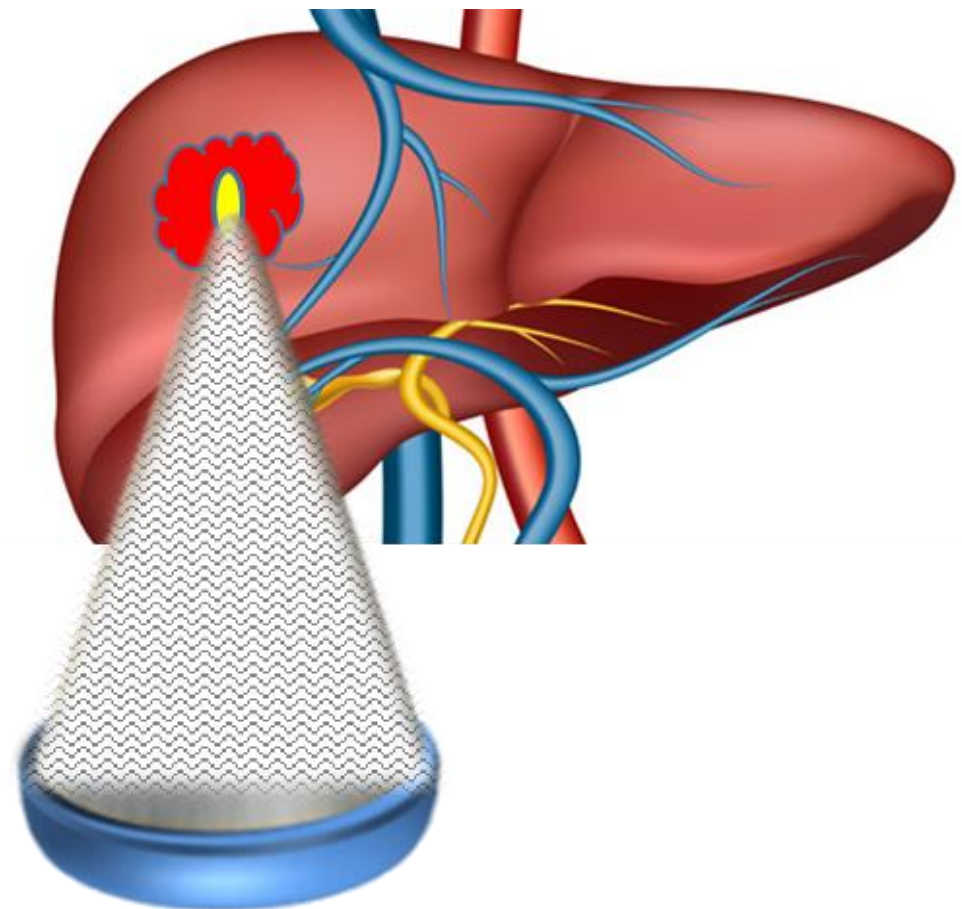


Figure 3: HIFU can noninvasively treat tumors inside the body using ultrasound energy (nonionizing radiation), and lead to tumor regression and cure.

HIFU is currently used to treat various other disorders like uterine fibroids, essential tremor, Parkinson's, prostate cancer, benign prostatic hyperplasia, and bone metastases. It is also being tested for other solid tumours such as soft tissue sarcomas, desmoid tumours, osteoid osteoma, and others. The great benefit of using HIFU to treat these patients is that most patients are generally considered as out-patient, and return home on the same day, after therapy. They also would not need to antibiotic administration after HIFU due to therapy's inherent noninvasive approach.

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Medical Ultrasound Research Laboratory (MURL) at Indian Institute of Technology, Hyderabad is currently working on newer HIFU methods that are more efficient in treating solid tumours. One of these methods of HIFU is termed 'Boiling Histotripsy (BH-HIFU)'. BH-HIFU physically breaks the tumours into smaller fragments and can do this with very sharp boundaries or high spatial resolution. BH-HIFU has demonstrated to cause the immune system to 'wake-up' and respond against tumours (Fig.4).

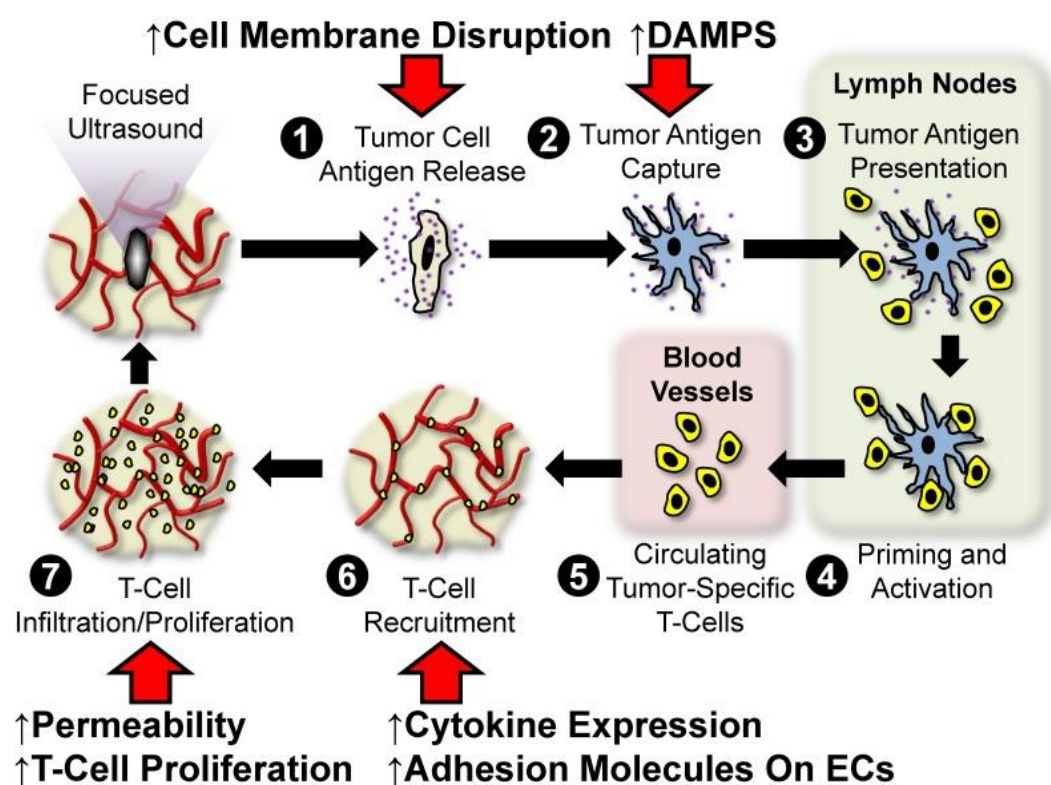


Figure 4: HIFU generates an immune response that could help the body fight the tumor. From: Curley, Colleen T., et al. "Focused ultrasound immunotherapy for central nervous system pathologies: challenges and opportunities." *Theranostics* 7.15 (2017): 3608.

In addition, it has also shown to make the tumour become detectable to the immune system, making them more vulnerable to an attack from the immune system. We also demonstrated that tumours tend to have multiple 'weapons' in their armoury, and protect themselves from additional attacks from the body's immune response (Fig.5). It is at this point where we are able to use immunotherapy or local delivery of encapsulated chemotherapy, to break these secondary defence mechanisms in tumours,

which otherwise just monotherapy would not have worked against these tumours.

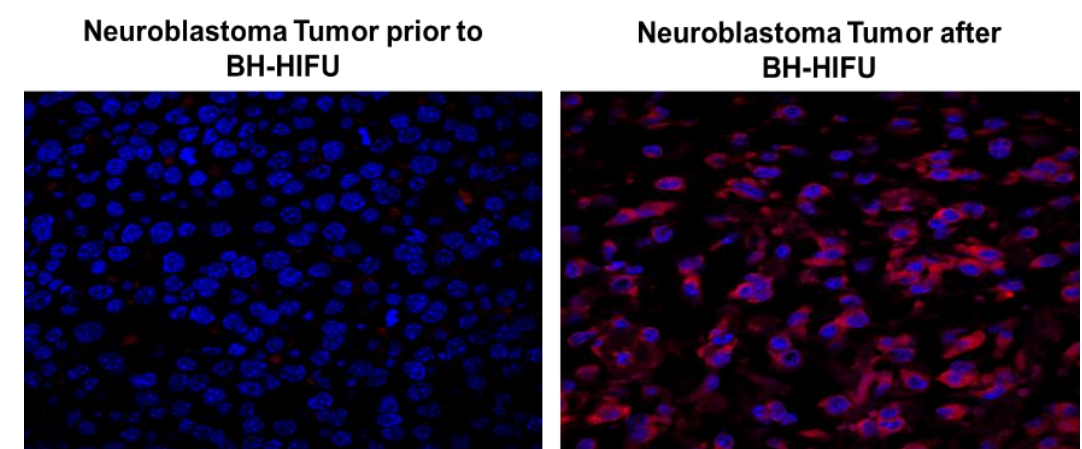


Figure 5: BH-HIFU forces the tumor to use its secondary defense mechanisms, and expose itself. It is at this point, that immunotherapy could be used to shut down the defense system(s), and kill the tumor cells. From: Eranki, Avinash, et al. "High-Intensity Focused Ultrasound (HIFU) Triggers Immune Sensitization of Refractory Murine Neuroblastoma to Checkpoint Inhibitor Therapy." *Clinical Cancer Research* 26.5 (2020): 1152-1161.

Tumours further become weaker and defenceless, and succumb to the body's immune attack, leading to local and metastatic tumour regression. Along with our collaborators at National Institutes of Health, University Medical Center Utrecht, University of Washington, and Children's National Medical Center we recently demonstrated the ability to create an 'abscopal effect' (treat a local tumour, and all metastatic tumours shrink) while treating locally large, refractory Neuroblastoma murine tumours. Monotherapy failed to treat these tumours, but the combination of BH-HIFU and immunotherapy worked well.

Continued...

More about this work can be found here:

Eranki, Avinash, et al. "High-Intensity Focused Ultrasound (HIFU) Triggers Immune Sensitization of Refractory Murine Neuroblastoma to Checkpoint Inhibitor Therapy." *Clinical Cancer Research* 26.5 (2020): 1152-1161. These results are very significant since it demonstrates the ability to convert a 'cold' tumour to a 'hot' tumour, and making the tumour defenceless to immunotherapy. Our group is also starting the world's first clinical trial using this BH-HIFU plus immunotherapy combination to treat patients suffering from triple-negative breast cancer (TNBC), and Neuroblastoma. These are patients who have unfortunately exhausted all other available options of therapy, and we hope this novel combinational therapy could give them more time in life to do what they have always loved to do.

Along with ultrasound-based technologies, other noninvasive technologies such as photothermal therapy (PTT) and photodynamic therapy (PDT) are also being tested as a monotherapy and combinational therapy to treat tumours such as melanoma. The technologies either use laser light to either accumulate a photosensitizer within the tumour (PDT) or use optical light (near-infrared wavelength) to generate heat and ablate (thermally kill) the tumour cells. These smart and noninvasive technologies are paradigm-shifting in terms of treating solid tumours, potentially leading to cure. There are several unanswered questions, and we have some ground to catch up to cure cancer. The time is now right for folks working on these technologies and similar areas to have a chat with each other and work together to tackle this devastating disease.

Dr. Avinash Eranki
Department of Biomedical
Engineering



3D Bio-printing of Tissues and Organs

Tissue/organ printing also known as 3D bio-printing is a major research area under healthcare where 3D printing has been used widely. This approach uses a layer-by-layer manufacturing process but uses cells, matrix materials, and bioactive molecules to develop artificial tissues and organs for transplantation purpose. The developed tissue or organ can also be used as an in vitro model for drug screening and discovery purpose as the printed tissue can recreate the complexity of that tissue. There has been unprecedented progress of this technology over the last decade and many different types of tissues like skin, bone, cartilage, trachea, heart, and many more have been developed in the lab. This technology has huge prospects to address the tremendous need for artificial tissue/organ to save the end-stage patients suffering from major organ failure as the supply of transplants do not meet the requirement. We are working on several projects majorly based on 3D bio-printing concepts on developing artificial cornea, liver, esophagus, skin, trachea, and others. The primary step of this process to develop a bio-ink, which is printable formulation consists of cells, matrix materials, and other necessary supplements for cell survival and function. We develop a novel process to prepare bio-ink from human and animal tissues/organs by throwing out the cells from these tissues and dissolving the acellular matrix or extracellular matrix (ECM) by an in-house developed protocol. The ECM bio-ink is then mixed with the cells and used for printing a particular tissue construct by designing tissue-specific structure and architecture and employing a 3D bio-printer to reproduce that design. Depending upon the target tissue the most relevant cell types are chosen for printing the structure, like for printing corneal stroma, we use corneal keratocytes and for printing liver,

we use primary hepatocytes. The printed tissue constructs are then cultured in a cell-culture incubator for their further maturation. Upon maturation, the tissues will be used for implantation purpose. Furthermore, the printed tissues are also being used as in vitro models for drug toxicity screening. We have developed an in vitro liver model using liver-matrix derived bio-ink and designing a sinusoid-mimicking structure to develop the “zonation” (a prominent feature of liver sinusoids). We could observe the zone-specific production of marker proteins, which further shows the usefulness of this model for zone-specific drug screening. The important feature of this in vitro model is that just by introducing a perfusion-based cell-culture model, we could develop the zonation. We are in the process of testing various known cytotoxic as well as safe drugs to evaluate the model further. Our primary interest is to develop this model as a reliable and reproducible liver model for drug discovery and screening and in future, we would like to collaborate with the pharmaceutical industry to validate this model further.

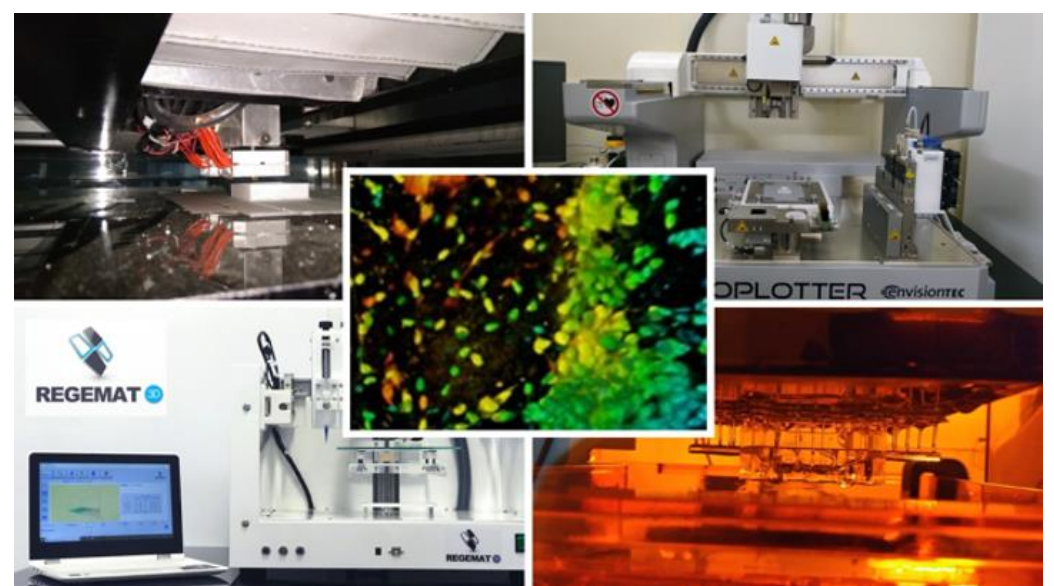


Figure 6: 3D Bioprinting facilities in BioFabTE Lab at IIT Hyderabad

Dr. Falguni Pati
Department of Biomedical
Engineering



Sweet path to hard vessels

India was already grappling with an epidemic of obesity and insulin resistance [1] before COVID-19 struck, particularly affecting the younger cohort, due to the confluence of a number of factors including, increased consumption of refined sugars and sedentary lifestyle among others. Increasing prevalence of insulin resistance, a condition characterized by a decrease in tissue responsiveness to insulin, in otherwise healthy youth is particularly concerning, as it predisposes affected individuals to early type 2 diabetes mellitus, and a spectrum of complications ranging from increased vascular stiffness, progressing to long term cardiovascular damage. Vascular stiffness is a well-known marker of cardiovascular health and increased stiffness of blood vessels will lead to an increased wall stress. This might lead to damage to the elastic elements of the blood vessel and hastening of the degeneration of the arteries that would otherwise occur due to ageing. In our recent study, the results of which under review, we studied the effect of insulin resistance (directly measured from blood samples) on the vascular stiffness (indirectly measured using ECG and finger PPG) changes in a variety of physiological and pathophysiological contexts in young adults. Quite interestingly, we found increased glucose levels in the blood post intake of glucose led to increased vascular stiffness. With increased insulin resistance, there was a faster rise in vascular stiffness and delayed the fall of stiffness to pre-glucose intake levels. Abnormal increases in vascular stiffness could potentially lead to higher cyclical stress on the vasculature following the meal and have the potential to speed up the vessel damage. Left untreated, insulin resistance could

lead to serious health risks to the younger populace and which could eventually lead to great economic costs to the country.

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- [1] Yajnik CS (2007) The Insulin Resistance Epidemic in India: Fetal Origins, Later Lifestyle, or Both 59:3–9. Authors
- [2] Dr. Aditya Koppula MD, PhD student, Dept. of Biomedical Engineering, IIT-Hyderabad
- [3] Dr. Kousik Sarathy Sridharan, Assistant Professor, Dept. of Biomedical Engineering, IIT-Hyderabad

Dr. Kousik Sarathy Sridharan
Department of Biomedical
Engineering



Dr. Aditya Koppula MD,
PhD student
Department of Biomedical
Engineering



Building Virtual Patients in-silico

Building Virtual Patients in-silico SPINAL CORD AND MOVEMENT LABORATORY MOHAN RAGHAVAN www.iith.ac.in/~mohanr Life cycle of medical devices and therapeutics are critically dependant on generation of evidence of safety and efficacy for regulatory compliance. Often this turns out to be a limiting factor draining a large number of man-hours, money, time and the resultant cost of lost opportunity. FDA estimates that the development of virtual physiologies and virtual patients will play a significant role going forward in accelerating medical device development pipelines [1]. Our lab works on building large multiscale models and simulations of the spinal cord, muscles and skeleton to achieve movement using biological mechanisms across scales. NEUROiD, the in-silico movement platform [2] built in our lab allows the construction of hybrid neuro-musculoskeletal models. The platform enables co-simulation of neural and musculoskeletal elements using a neural simulator NEURON [3] and a musculoskeletal simulator OpenSim [4].

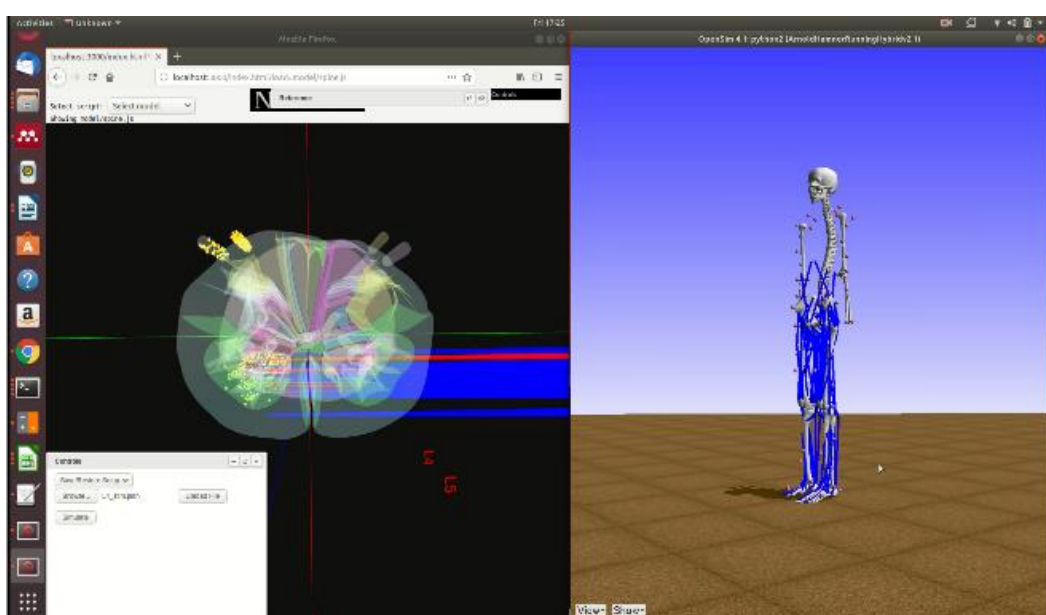


Figure 7: Screenshot from the NEUROiD in silico movement platform with the spinal cord controller(left) and the lower limb musculoskeletal model (right)

We build in-silico models of lower and upper limbs that can move when electrically stimulated at the level of the spinal cord.



Figure 8: A screenshot from NEUROiD in silico movement platform with the spinal cord controller (centre), slice view (left) and the upper limb musculoskeletal model (right). Traces of electrical activity may be seen on the top panel.

Neuroanatomy and physiology of ion channels, neurons, synapses, circuits and tracts are modelled in a hierarchical and modular manner. Using these models, we demonstrate the distribution of various degrees of freedom in movement that are controlled by circuits along with the rostrocaudal extent of the spinal cord [5]. In-silico simulation experiments in our models demonstrate broad similarities with microstimulation experiments. We believe that these technologies will be invaluable as a virtual patient or physiology in the development of spinal cord electrical stimulation therapies for pain and rehabilitation.

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Dr. Mohan Raghavan
Department of Biomedical
Engineering



Avoid JUNCS

Over the last two decades there has been an increasing trend of consumption of fast food and sugar sweetened beverages (fruit juices and drinks, carbonated drinks, energy drinks) in Indian children. Easy availability, convenience, palatability, working parents, attractive presentation, catchy advertisements, low cost, and vigorous marketing strategies are considered the major factors for high consumption of these products. In view of easy availability and increasing trend of consumption of fast foods and sugar sweetened beverages (fruit juices and drinks, carbonated drinks, energy drinks) in Indian children, and their association with increasing obesity and related non-communicable diseases a new acronym 'JUNCS' foods, to cover a wide variety of concepts related to unhealthy foods.

- **J-** Junk foods (foods high in fats, especially saturated and trans-fats, sugars and salts, and foods lacking in micronutrients/minerals)
- **U-** Ultra processed foods
- **N-** Nutritionally inappropriate foods. Home-made foods can also qualify to be nutritionally inappropriate if prepared in recycled oil, or contain high amount of sugar, fat or salt.
- **C-** Caffeinated/ colored/ carbonated beverages
- **S-** Sugar sweetened beverages

The major adverse effects related to intake of fruit juice and fast foods are obesity and its associated complications, dental caries, allergies, micro-organism contamination leading to infections, and risk of cancer due to carcinogenic and allergenic properties of some food additives. As per National Family Health Survey 2015-16, the number of people with obesity has doubled over last 10 years in India; with an increasing trend of being overweight in children and adolescents. Energy drinks also

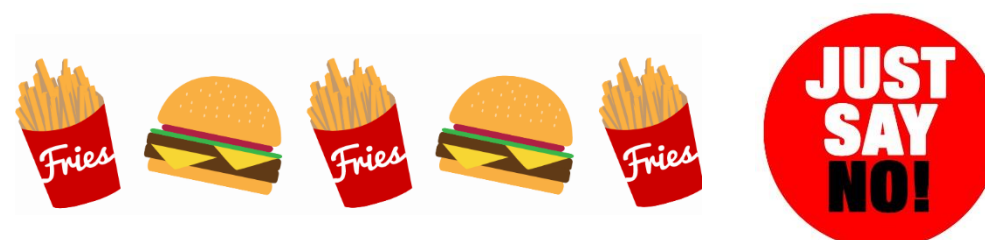
caffeine content leading to neurological and psychiatric symptoms, and cardiac dysrhythmias.

Guidelines and Recommendations:

- Avoid consumption of the JUNCS foods and beverages by all children and adolescents, as far as possible.
- Alternatively, limit consumption of the JUNCS foods at home/outside and suggest to have not more than one serving per week; serving not exceeding 50% of total daily energy intake for that age.
- Do not consume foods while watching television/screen.
- To eliminate trans-fat and reduce free sugars to <5% of total energy intake.
- Freshly cooked home foods with minimal addition of sugar and no trans-fats should be preferred over restaurant/packaged foods.
- Traditional and acceptable home-made snacks with long shelf-life can be offered to children as alternative to the JUNCS foods.
- Lunch boxes packed only with healthy food should be carried to school if school does not have provision of providing healthy mid-day meal.
- The JUNCS food should not be offered as reward/gift to any child as this gives undue promotion to unhealthy foods.

Reference:

INDIAN PEDIATRICS-VOLUME 56, OCTOBER 15, 2019. Images for representation purpose only.



Continued...

Importance of Wearing a Mask

- With more than 64 million cases, using a mask is necessary in order to stop the spread of the virus from an infected person and protect those who are around them
- A mask itself won't help in keeping away the SARS-CoV-2 virus. It needs to be used in conjunction with other safety measures namely hand hygiene, the physical distancing of at least one metre, avoidance of touching one's face, respiratory etiquette, adequate ventilation in indoor settings, testing, contact tracing, quarantine and isolation.
- It is important to either be outdoors or in well-ventilated areas indoors because the virus can spread easily inside. According to the CDC, the risk of being infected with the SARS-CoV-2 virus in enclosed areas is 18.7 higher than outdoors and can also cause super spreader events to occur. Superspreader event is when one infected individual infects an "unusually high" number of people in their proximity causing multiple secondary cases
- Health care workers need to wear medical masks in non-aerosol generating procedure and wear N95 respirators, if they are available, in aerosol-generating procedures. In hospitals, everyone needs to wear masks and this applies to visitors, staff, patients, and also in common areas like the cafeterias and staff rooms.

Advice for children

- The WHO has stated that children upto five years do not need to wear masks if they are infected for 'source control'. source control is an old term used to control ongoing

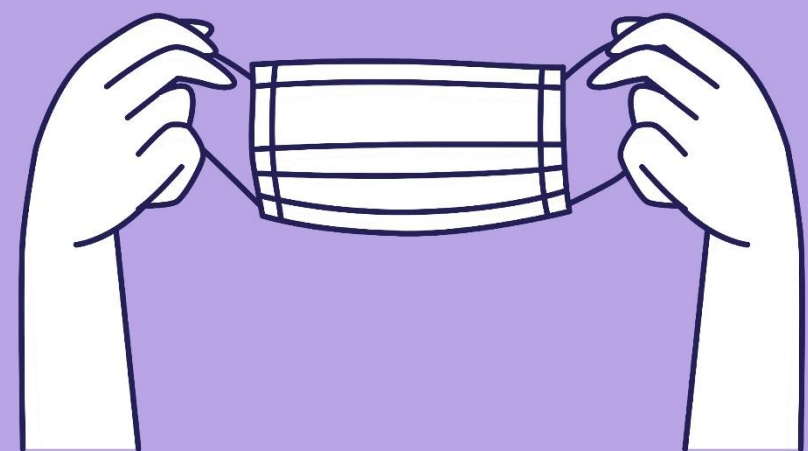
infection. It involves all the "physical actions taken in the process of care to control" an infection and reduce the "favourable conditions that promote microorganism growth.

- For children who are between the ages of six to 11, wearing a mask depends on if they actually understand how to properly wear and if there are adults around to supervise, how intense the transmissions is in the area if there are elderly people around, etc.
- The rules for children and adolescents 12 years and older follow the same as those for adults. But exceptions can be made for children with compromised immunity, paediatric patients with cystic fibrosis or diseases like cancer and for children who are specially-abled

Designed by: Mahima
Nareshchandra Dahekar
Department of Design



NO MASK



NO FOOD

Continued...

Here are a few reminders from the WHO:

The elderly and those with health issues should always wear a medical mask when the physical distance of at least one meter is not being maintained.

Caregivers of those who are suspected or confirmed to be infected should wear a mask when they are in the same room as the patient.

Homemade masks should be three-ply with the outermost layer made of a material that repels water and the innermost layer made with a material that can get wet with water. The middle hydrophobic layer should be made with a material that "has been shown to enhance filtration or retain droplets."

Do not use masks with an exhalation valve.

Factory-made fabric masks should have proper filtration, be breathable and fit properly.

Ensure that the mask covers the mouth and nose and minimize any gaps between the face and the mask.

Always perform hand hygiene

Replace the mask if it becomes damp or wet.

Do not re-use single-use masks and dispose of properly.

Do not remove your mask while talks and don't share masks

Reference: WHO-Latest update on wearing the masks



galat mat peheno

please wear your mask properly

Designed by: Mahima
Nareshchandra Dahekar
Department of Design



Dr. Raja Adharnath
Medical Officer
IIT Hyderabad



Stay healthy and protected during this current pandemic

As COVID-19 continues to spread across the country and the world, we all should play a responsible role to take care of ourselves and the community. The more steps you can take to prevent the spread of COVID-19, the more you are protected. Following are the few responsible role for everyone.

Practicing regular preventive actions:

- Wear masks around people not living in your household, and in public places.
- Wash your hand frequently with soap and water or use alcohol-based hand rub
- Maintain social distancing- stay 6 feet apart (specially from someone who is coughing or sneezing)
- Limit contact with commonly touched surfaces - disinfect frequently
- Keep items along with you while going out: a mask, tissues, and a hand sanitizer, if possible
- Avoid close contact with visitors at home or office. For example, don't shake hands or hug. Instead verbally greet them.
- Taking care of your physical and mental health: Hearing about the pandemic repeatedly can be upsetting.
- Mental health is an important part of overall health and wellbeing. How do you improve your mental health? Talk with people you trust about your concerns and how you are feeling. Do not hesitate to utilize support services and medical help, including counselling or therapy, whenever needed. Take breaks from watching, reading, or

listening to related news. Try to do some other activities which you enjoy.

Physical activity:

Its importance to stay physically active to cope with stress. Physical activity reduces blood pressure and anxiety and helps you sleep better, improve mood and energy level.

- Eat healthy, well balanced meals
- Get plenty of sleep (more than 7 hours)
- Avoid smoking - smoking increases your risk of severe illness from COVID-19. If you currently smoke, try to quit.
- Who are at increased risk of severe illness from COVID-19 infection?
- Older adults and people with pre-existing health issues like - Heart diseases, COPD/ chronic lung diseases, chronic kidney disease , immunocompromised state from solid organ transplant, Cancer, obesity, pregnancy, smoking, Diabetes, high blood pressure.
- If you have any pre-existing medical conditions: Continue your medicines and do not change your treatment plan without talking to your healthcare provider. Talk to your healthcare provider, whether your vaccinations are up to date. Particularly those are at increased risk of severe illness, it is important to receive recommended vaccinations against influenza and pneumococcal disease.

Continued...

- COVID-19 and children: Fewer children have been affected compared to adults. Most children have mild symptoms or no symptoms at all. However, infants and children with certain underlying medical conditions, might be at increased risk for severe illness from COVID-19. Well-child visits and vaccines are still important during the COVID-19 pandemic. Stay in contact with your child's healthcare provider and make sure your child is up to date with vaccines to prevent other diseases.
- COVID-19 And Pregnancy: Based on what we know at this time, pregnant women are at increased risk for severe illness from COVID-19, compared to non-pregnant. There might be an increased risk of adverse pregnancy outcomes, such as preterm birth.
- Do not skip your healthcare appointments during and after pregnancy.

Some Facts against myths about COVID-19

- Micronutrients, such as vitamins D and C and zinc, are critical for a well-functioning immune system but cannot cure COVID-19.
- The prolonged use of medical masks does not lead to CO2 intoxication nor oxygen deficiency.

Who should NOT use masks?

- Children younger than 2 years old
- Anyone who has trouble breathing, unconscious, or unable to remove the mask without assistance
- While exercising, as masks may reduce the ability to breathe comfortably. Sweat can make the mask become wet, makes it difficult to breathe and promotes the growth of microorganisms, maintain physical distance of at least one meter from others.
- ID-19 VA

Reference:

- <https://www.mohfw.gov.in/>
- <https://covid19.who.int/>
- <https://www.cdc.gov/>

Dr. Baishakhi Chandra
DNB, DTCD, MBBS,
ECFMG (USA),
Pumonologist,
Lady Medical Officer,
IIT Hyderabad



Fluorescence anisotropy in deciphering biophysical properties of membranes and proteins

Membranes and proteins are integral components of a cell. They perform a wide range of function within the cells. To get insights into the fundamental principles underlying their function, scientists are taking help of various fluorescence-based spectrometry techniques. Fluorescence, because of its high sensitivity and high specificity, allows the researchers to explore the macromolecular dynamics at single-molecule level in real time. Scientists mostly use techniques such as fluorescence quenching, fluorescence polarization, fluorescence-lifetime measurement, fluorescence microscopy, fluorescence correlation spectroscopy and time-resolved fluorescence, to study the biophysical properties of an analyte. Meanwhile, fluorescence anisotropy (FA) has created a unique niche for itself because of its wide range of applications in biochemical research.

FA measurements have been used to study protein folding kinetics. This can help scientists get new clues on how the proteins, like tau and amyloid- β within the neurons, misfold and give rise to diseases like Alzheimer, Parkinson and Huntington.

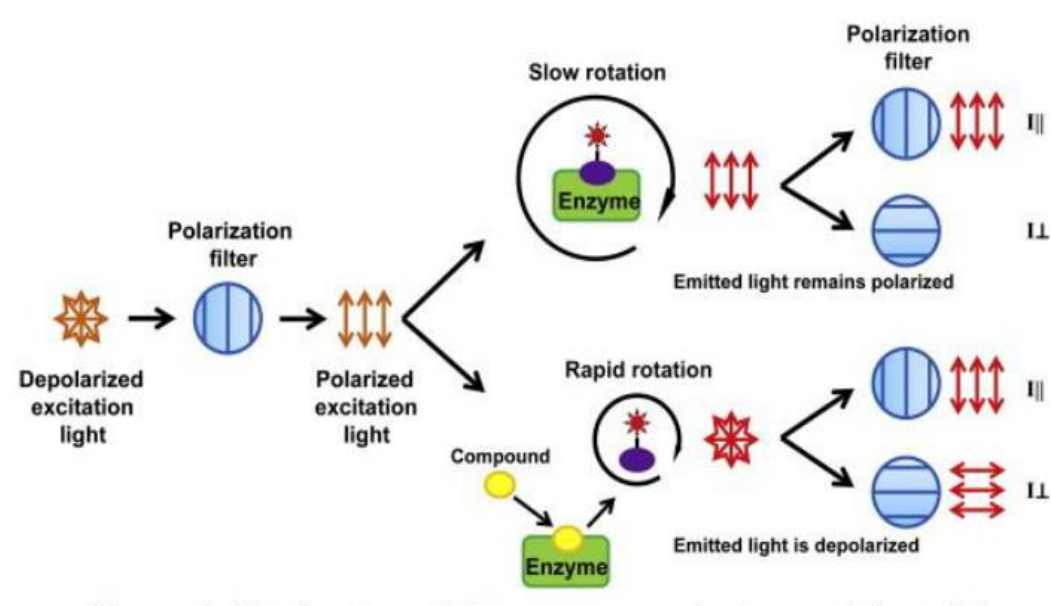


Figure 9. Mechanism of fluorescence anisotropy. Adapted from Zeng et al. 2018

FA can be used in the study of DNA-protein binding. With the help of this, scientists can look at how the interaction of certain proteins with genes, control its expression pattern and lead to several diseases like cancer and autoimmune disorders.

FA measurements of membrane probes like DPH and TMA-DPH have been used to elucidate different membrane properties like membrane potential, membrane fluidity, phase-transition temperature, under varying degrees of cholesterol-phospholipid composition. Researchers can use these insights to explain the mechanism behind diseases like obesity and atherosclerosis.

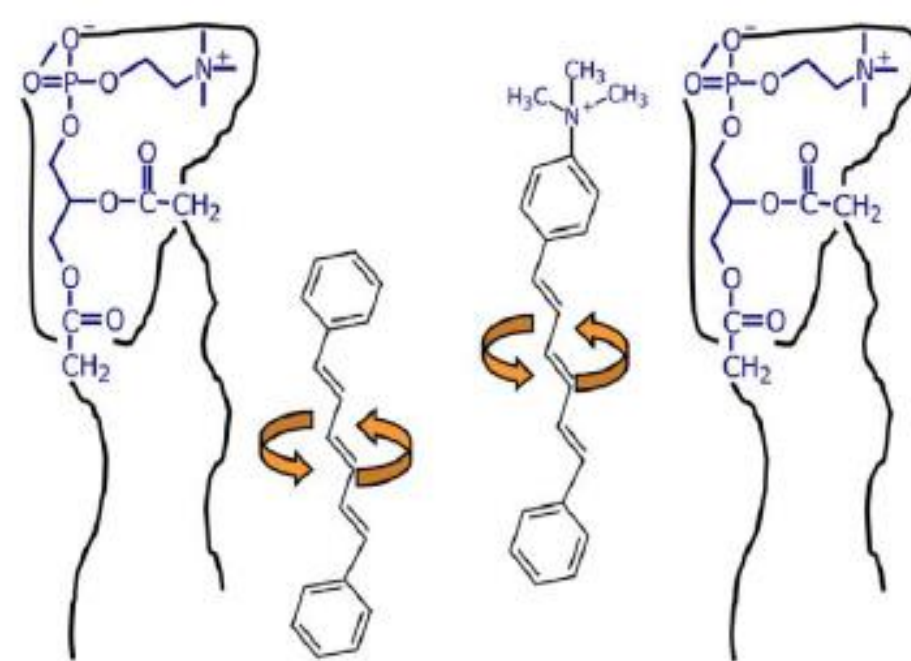


Figure 10. Membrane probes DPH and TMA-DPH inside in phospholipid layer Adapted from Shrivastava et al. 2016

FA can also be used in the high-throughput screening of cholesterol-lowering agents and anesthetic drugs and elucidation of their mechanism of action based on their partition coefficient and effect on membrane fluidity. I amassed this enormous amount of knowledge during my internship at CSIR-CCMB, Hyderabad. I worked as an intern in the membrane biophysics lab of Dr. Amitabha Chattopadhyay, SERB distinguished scientist. His group introduced me to the world of biophysics from the perspective of phospholipids and synthetic liposomes.

Continued...

I prepared model membranes using liposomes and carried out its fluorescence anisotropy measurement. I investigated the fluidizing effect of a novel cholesterol-lowering drug 1-octacosanol on model membranes of three different phases i.e. liquid-crystalline, gel and liquid-ordered phases. The reason of exploring this drug molecule was that it has fewer side effects and that too of lower magnitude as compared to statins. Moreover, it increases the level of HDL cholesterol and is extracted from plant wax.

I always wanted to propagate this cutting-edge research technology of fluorescence anisotropy but I felt that through all these times, I didn't get the right audience to

present it to. But I have a strong belief that things come to you at the right time and at the right place. And recently, I along with my partner Susmita Pati from CET Bhubaneswar, won the 'ACS best poster award' for presenting the poster on topic 'Exploring Biophysical Properties of Membranes and Proteins using Fluorescence Anisotropy' at the 1st National Students' Conference on Spectroscopy-2020, jointly organized by CRSI and SciRox-Science Club, GNDU, Amritsar.

This achievement is really special because it embarks the beginning of my journey in the scientific community. And what makes it more special is that I got it after joining IIT Hyderabad!!!

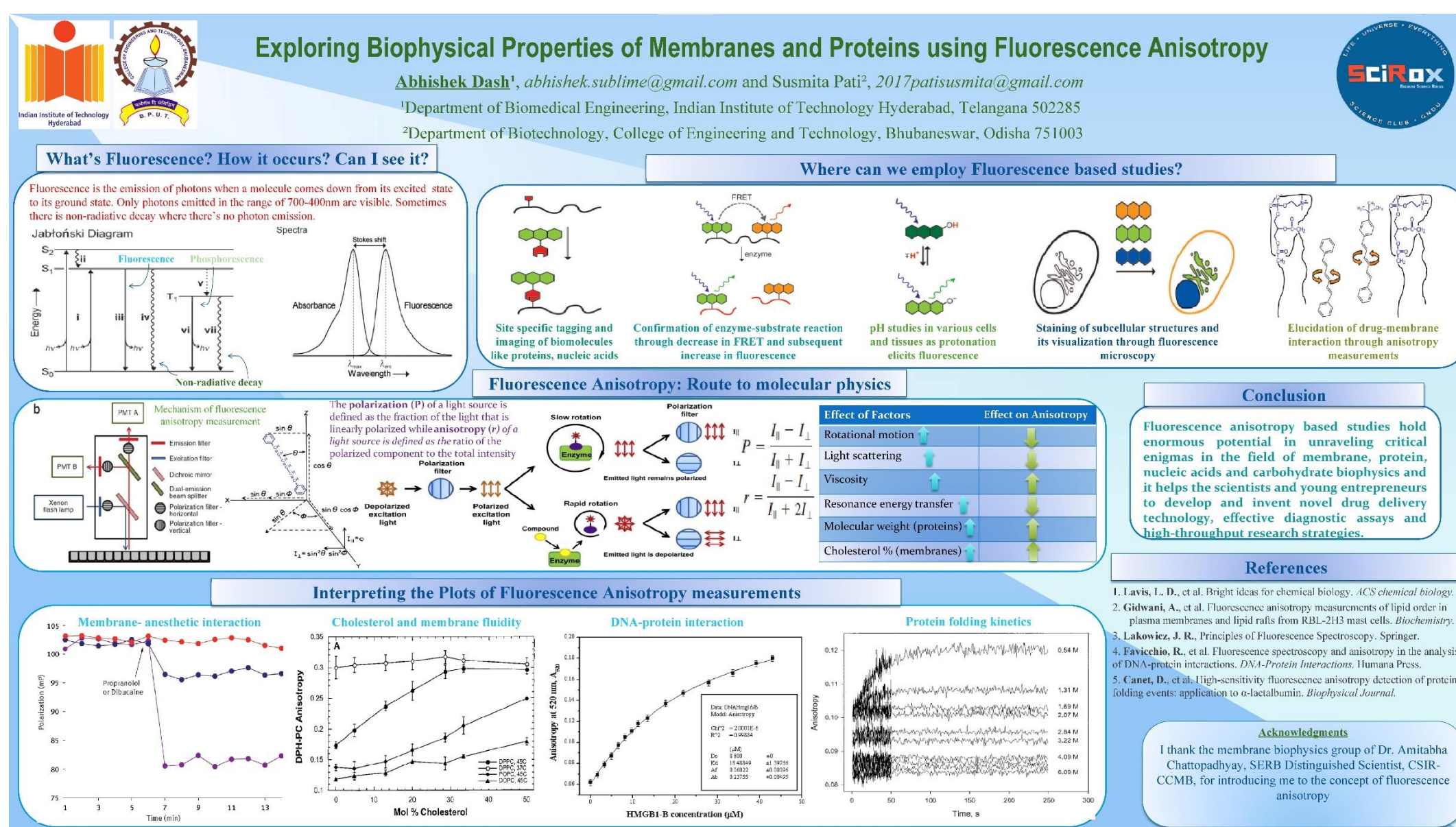


Figure 11. Brief Summary of the Work

Mr. Abhishek Dash
Research Scholar
Department of
Biotechnology



Life on campus before and after COVID-19

Getting up, going for jogging or playing some sport, then getting ready and having breakfast with friends often overcrowding at tables or at food counters, then going to the lab in buses, sometimes even standing because there were no seats available, going to the city on weekends, having food from dhabas, long rides, this was how most of our lives on campus were about 10 months ago. After this, the global pandemic struck and changed these a lot. It is global not only in the sense of its distribution but also at the individual level where it is globally or comprehensively affecting all aspects of our lives irrespective of whether we have the disease or not.

Institutions and management across nations are now trying to get the normal life back on the track alongside increasing productivity and making lives of their employees/ students/ workers more comfortable at the same time co-existing with the restrictions. IITH was closed for about four months before it was ready to receive the first batch of students and quarantine them for the mandated 14 days. These months at home on one hand felt good as we were getting to spend such a long time with our families after a very long time. But on the other hand, we were missing our friends in campus, we were missing our friends in the lab, the fun which we had while going to the city on weekends, the games and sports we played regularly, the late-night snacks in the cafeteria, the midnight birthday celebrations, we missed the sense of self-dependence we felt while on campus. We missed the sense of togetherness we feel while we are among our friends. With more batches of students joining in and finishing their quarantine, we are getting most

of these things back but with a new normal.

In the new normal, we are trying to get used to and accept the COVID-19 precautions. In mess, we have to sit distantly from each other, group activities like sports, cultural, celebrations etc. are not allowed, we have to put the mask on at all public places and restrict contact with people who are not a part of the biobubble we have created inside the campus. All this is good to prevent COVID-19 infection, but this increases the risk of developing mental health issues due to the academic pressures coupled with not having a stress releasing mechanism in the form of sports or interaction with friends or outing. Especially for students who are attending online semester, it is even more difficult to submit the assignments, take tests at the same time attending to the family duties and household chores. At home, there are several factors which are not under our control which affect our focus on studies. It can vary from household responsibilities to family expectations of meeting relatives or friends to whom we can't say no often. Such factors, to a large extent, do not affect our lives when we are on campus but are more pronounced when we are at home.

Personally, I feel that in the current situation I can be more focused and productive in my research work because now the thought of playing a sport or going out with friends is simply non-existent. It has also increased the time I spend in the lab although I do miss playing cricket at times. The extra time at my perusal due to the new norm allows me to do some extra study of research papers as well.

Continued...

Because we constantly try to diversify our activities and in the process pick up new hobbies. With limited options now available to me, I think I am participating and concentrating more on each activity that I am doing and can find joy in them be it research or reading or jogging or even some discussion with my friends. This pandemic is teaching me to be in the present, make the best of the moment and be hopeful.

As students, we are all doing our best in trying to adapt to the new norms and we understand the need to do so too. But sometimes we do feel that in some aspects, restrictions are imposed as a blanket ban. As a doctoral representative, I along with my fellow doctoral representative are constantly trying to adapt and pertain to changing students' needs in these exceptional times. The amenities which

were easily available to all before COVID-19 situation are restricted now and to that end, we need rationalization of rules towards which we are constantly trying. At the same time, we are endeavoring to strike a balance between the students' comfort and making students aware of the need for a particular rule for everyone's safety. Also, in trying to co-exist with the new norms, we are also focused towards the aim for which we are all here i.e. building our careers and we wish to organize seminars and events to that end as well.

I hope and I pray that for all of us this experience brings an understanding that things may not always turn out the way we want, but if we can constantly adapt to the changing situations, we are increasing our chances to come out stronger, wiser and happier at the end of it.

Mr. Akarsh Bajpai
Research Scholar
Department of Biotechnology



Enhanced bioactivity of hydroxyapatite with iron oxide nanoparticles for theranostics

Hydroxyapatite is a widely used biomaterial for bone tissue engineering and other biomedical applications. It occurs naturally in a mineralized form known as calcium phosphate. Hydroxyapatite resembles like a bone apatite but lacks mechanical strength and is less bioactive in nature. To overcome these shortcomings there are several metal ions used for doping hydroxyapatite including iron oxide nanoparticles. The synthesis process is carried out by various different routes such as hydrothermal, spray drying, ultrasonic irradiation etc. Incorporating different metal ions such as iron, copper, strontium and manganese with hydroxyapatite had shown enhanced bioactivity and cellular response. In our recently published study on doping iron oxide nanoparticles with hydroxyapatite (10.1016/j.ceramint.2020.07.285), we have reported the accelerated synthesis of nanomagnetic hydroxyapatite (nMHAp) in simulated body fluid which is one of the novel methods so far. The study confirmed the initial nMHAp precipitation in 3 h than the conventionally used duration (over 24 h) through a bio-mimetic approach. The physicochemical properties were checked using XRD, FTIR, TGA, XPS, DLS, SEM, TEM and VSM.

The results suggested that the synthesized nMHAp contains magnetic properties and resembles carbonated apatite with the traces of Na, Mg, K, Cl and Fe. Cellular biocompatibility and the measurement of reactive oxygen species using L929 cells confirmed the biocompatible and antioxidative nature of nMHAp. Hence, Our studies showed that

nMHAp can be synthesized biomimetically in 3 hrs and potentially could be used for various biological and biomedical applications including bone tissue engineering, contrast reagent for MRI, nanocarrier for gene and drug delivery.

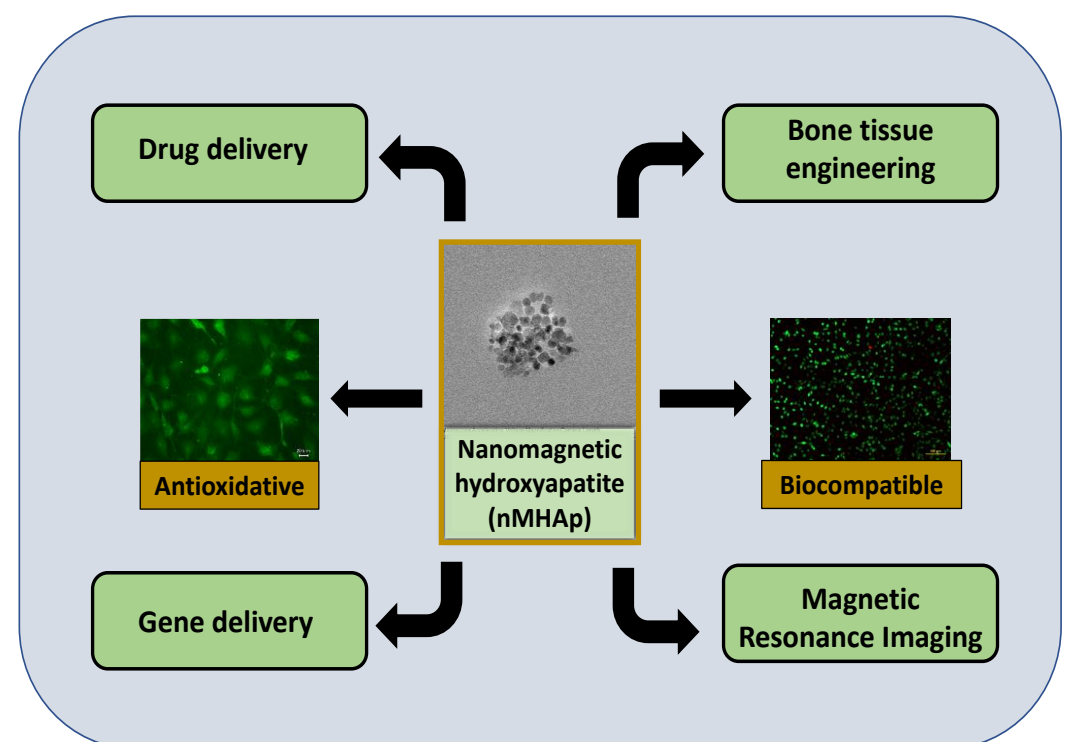


Figure 12: Graphical Abstract

Mr. Akshay Bhatt
3rd year PhD Scholar,
Regenerative Medicine and
Stem cell Lab (RMS)
Department of Biomedical
Engineering



Turning the untapped stones of the repurposed drug Auranofin

Drug repurposing is an affordable and sustainable way of using the existing approved drugs to alternatively utilize it for treatment of other ailments. Auranofin is an antirheumatic agent, repurposed for its antibacterial (1, 2) and antiprotozoal activity (3, 4). Auranofin targets a class of enzymes called Thiol-reductases (TRs) which are involved in maintaining reactive oxygen species (ROS) or oxygen free radicals homeostasis in the cell. Build up of these ROS can cause damage to nucleic acid content of cell i.e. DNA and RNA, and proteins which can eventually lead to cell death. Auranofin is a metal (Gold or Au) conjugated drug which transfers its Au atom to the target enzyme in turn permanently inhibiting its catalytic function. Although how this transfer of metal atom actually occurs was unknown. Comparing the amino acid sequences and analyzing the docking and simulation results of TRs from different parasitic organisms against Auranofin we have mapped the binding site of the drug and proposed the plausible mechanism of transfer of Au which forms a basis for understanding the formation of metal coordinated adducts (5). This mechanistic understanding can further assist in repurposing of the drug. We also designed some of the Auranofin analogues which were showing better in silico results compared the parent molecule, Auranofin, which can be optimized and tested in future as potential drugs against TRs (5).

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Ms. Deeksha Waghela
Research Scholar
Macromolecular Structural
Biology Lab
Department of Biotechnology



The multifaceted aspect of health: A biopsychosocial approach

As a team of researchers and clinicians working with **Dr. Mahati Chittem**, Associate Professor of Health and Medical Psychology, Department of Liberal Arts, IIT Hyderabad, our research and practice lies at the intersection of psychology, health, and medicine.

Our team is developing a body of exploratory and experimental research to improve individuals' understanding of their health and illness and, in turn, enhancing healthcare uptake in India. We work in collaboration with doctors, engineers, allied healthcare professionals, and national and international academicians. Our research is detailed below:

1. Self-management among patients with Type II diabetes:

The project highlighted the complexities of the socio-cultural determinants of diabetes management. It also focused on understanding the discrepancies in the patients', caregivers', and physicians' perspectives on the illness and treatment, implying the need to focus on communication interventions to improve the We examined day-to-day management of diabetes.

2. Parental stress among couples when the woman has chronic kidney disease (CKD):

The study revealed that parental stress was linked to socio-economic factors. The study also

indicated the need for individual counseling for patients and their caregivers to deal with their emotions precipitated by the illness.

3. Psycho-oncology in India:

Our studies focused on patients' supportive care needs, (non)disclosure of a poor prognosis, caregivers' and oncologists' perspectives on communication, and end-of-life decision-making. Based on this large body of work in psycho-oncology, we developed a culturally and linguistically tailored intervention, the Question Prompt List, which centers on facilitating a meaningful interaction between Indian oncologists, patients and their caregivers.

In an ongoing project, we use novel techniques such as body mapping to understand men and women's perceptions of the female reproductive system. This study aims at understanding the cultural underpinnings of cervical cancer in an attempt to underscore the gaps in health literacy among under-served populations.

More recently, we are exploring medical decision-making and its psychological outcomes among children with retinoblastoma requiring enucleation, their parents, and oncologists. We hope that this project will build on our existing work in cancer communication.

Continued...

4. Cultural contexts of health-seeking:

Cultural contexts and sociodemographic determinants of health behaviors of diet, exercise and sex. Currently, we explore dating and sexual intimacy during the Covid-19 pandemic. This project provides unique insights into the changes in dating and sexual behaviors brought about by the pandemic, underpinning how the macro (e.g., politics, communities, public health) can influence individual decision-making.



Ms. Subha Gomathy*
(Research Scholar)
Department of Liberal Arts

Ms. Sravanthi Maya*
(Research Scholar)
Department of Liberal Arts

Ms. Shweta Chawak*
(Research Scholar)
Department of Liberal Arts

Ms. Matsungshila Pongener*
(Research Scholar)
Department of Liberal Artsz

Mr. Prathyasha George*
(Research Scholar)
Department of Liberal Arts

Ms. Sivabathini Navya Suma*
(Research Scholar)
Department of Liberal Arts

Mr. , Chetan S.V.*
(Research Scholar)
Department of Liberal Arts

**All authors contributed equally to this work*

Tackling Cancer at Molecular Level

As per the WHO stats, Cancer, the 2nd leading cause of death worldwide, happens due to mutations in functional genes. According to the American Cancer Society, about 5% to 10% of all cancer are due to inheritance of the cancer-causing mutation. For remaining cases, environmental factors such as UV radiation, exposure to a carcinogen or the lifestyle of an individual is responsible. There are multiple proteins involved in the growth of a cell. Proteins are the factors that are involved in almost every aspect of cellular function. Abberation in their function leads to either cell death or abnormal growth leading to tumour formation which is termed as a “malignant tumour” (Type of tumour that represents cancer). Proteins are manufactured in the cell through a series of events from DNA to messenger RNA (mRNA) and to Protein.

There was a theory called “one gene-one protein”, it means one gene can only code for one protein. But further research found that one gene can code for multiple proteins. Answer for this lies at the mRNA level. Matured mRNA is composed of patched of sequence that is joined together in different combination to generated multiple protein isoforms, by the process called as alternative pre-mRNA splicing. There is a bunch of proteins that carryout this function depending on modifications on mRNA. One such modification is “m6A”, which is added by a group of proteins called “m6A writers”. Further read by “m6A reader” proteins to execute the function associated with it. One such function, alternative pre-mRNA splicing is carried out by these m6A readers.

My work is mainly focused on such m6A reader to identify its role in alternative pre-mRNA splicing and can be used as a novel drug target to interfere with its function that probably will lead to reduced cell growth in malignant tumours. Mechanistically, m6A is added to GGACU consensus sequence in the mRNA, which is mostly found near splice sites in the mRNA. So the m6A reader along with other auxiliary proteins helps to splice specific factors to either include or exclude a patch of sequence in the mRNA generating different isoforms. These isoforms could be the factors that need for cell growth and survival. So if we alter the function of this m6A reader protein by targeting with drug molecule, we could avoid the abnormal cell growth in a malignant tumour.

Mr. Rajnikant Dilip Raut
(Research Scholar)
Department of Liberal Arts



IIT Hyderabad – A cradle for young start-ups

My journey in the field of architecture and design starts from the College of Engineering and Technology, Bhubaneswar, Odisha. Then, I went to New Delhi to complete my master in product design from the School of Planning and Architecture. I joined a Cosmos Media Product Pvt. Ltd. as Head of Design before opening my partnership design firm “R Square Dezin” in New Delhi. My passion for design and sharing led me to teach, and I taught for six years as faculty in product design at Sharda University and Pearl Academy, New Delhi before I joined IIT Hyderabad to pursue my PhD in product design. Joining IIT Hyderabad had given me many opportunities such as my selection for Joint PhD Program with Swinburne University Australia. It has opened up many avenues which have led to a fantastic journey of innovation and research.

I joined IIT Hyderabad way back in July 2017, and since then I have an incredible journey of research, product development and of a start-up. Starting from the first itself, our faculties, especially Prof. Deepak, Dr. Prasad, and Dr. Neelkantan encouraged and promoted the development of innovative products. They not only supported in conceptualising new ideas and tackling everyday issues but also helped in sponsoring the projects. Their constant support and excellent facilities at IIT Hyderabad helped nurtured my ambition to open a start-up to create products to benefit society at large. IIT Hyderabad, with its many initiatives to promote start-up and entrepreneurship, has developed facilities such as DIC, CfHE, iTIC, etc. In one such facility, I met Nibedit Dey, and it led to the development of IBrum Technologies, a start-up that caters to health and sustainable products. IIT Hyderabad to promote product development and innovation started the Bold and Unique Ideas Leading to Development (BUILD) project which provided monetary support to student

projects. Swatchh Air, Bio-Bricks and Face Shield are three of our projects that got selected, and this led to the development of the prototypes.

Swatchh Air - A low-cost air sterilisation system

In recent years, most of our government building, corporate offices, hospitals, malls are going for air-conditioning system. But there is a steady rise in the indoor air pollution and circulation of pathogens. With COVID-19 pandemic, which is an air-borne disease, there is a massive demand for an air-sterilisation system that works continuously to remove not only suspended air pollutants but also kills the viruses and pathogens in re-circulated air. Our system is based on the technology which was published in IEEE and won the best research paper award. Swatchh Air will also help in normalising the situation and make the transition to the new normal much easier. Our system can be a great help in quarantine centres, clinics, nursing homes for COVID-19 where the viral load in the air is very high, and it will make it comparatively safe for health-worker to give proper care to the patients.

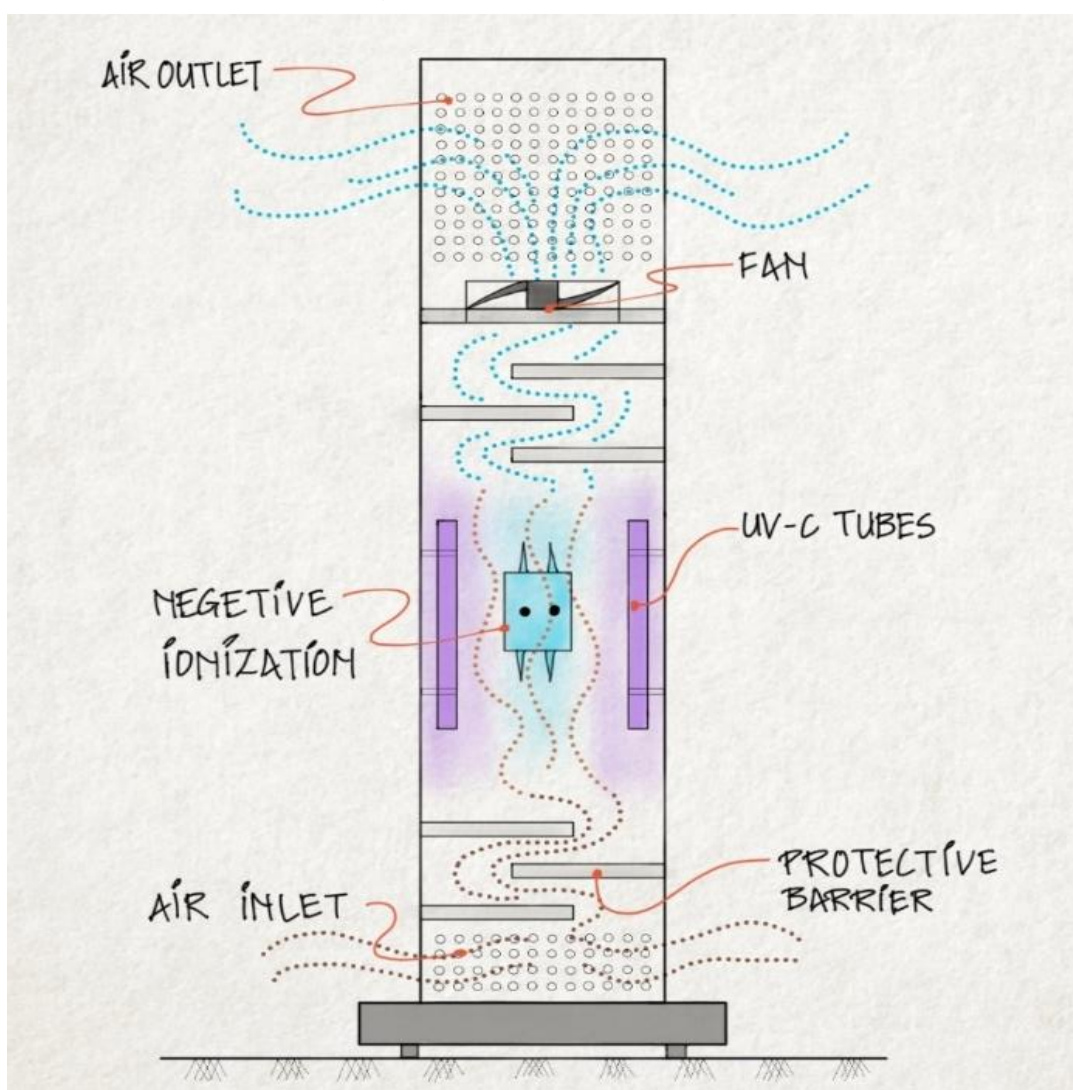


Figure 13: Working Prototype of Swatchh Air

Continued...

Working

The air is taken from the perforation at the bottom of the device, and the air is passed through a closed chamber irradiated by UVC lights and bombarded with negative ions. The high voltage negative ions, along with UVC, destroys the cell structure and kill all the bacteria and viruses. Negative ions also remove all the suspended particulate pollutants such as dust, pollens, dust-mists, odour etc. Based on 253.7 nm UVC lights.



WHO acknowledges 'evidence emerging' of airborne spread of COVID-19

"...The possibility of airborne transmission in public settings cannot be ruled out," WHO technical head said.

Reuters • July 08, 2020, 11:23 IST

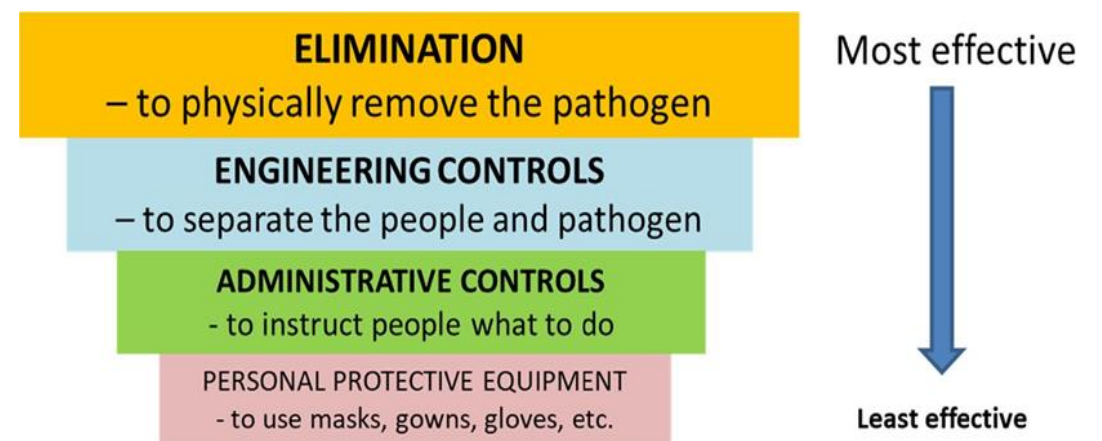


Figure 14: Working Methodology and concept behind Swatchh Air

Awards

Best Ten Start-up awards at 28th Annual HYSEA Awards on 5th November 2020.

Based on the founder's previous award-winning

Publication

<https://ieeexplore.ieee.org/document/5735407>



Figure 15: Concept designs for future models of Swatchh Air



Figure 16: Showcasing the prototypes to Dean of Students at IIT Hyderabad

Continued...

Bio-Bricks – a sustainable building material



Figure 17: Working Prototype of Bio-Bricks

Agricultural waste burning is a significant source of pollution in India, especially after the harvesting season. Bio-brick was developed as an alternative and sustainable building material that acts as an alternative to stubble burning. Stubble burning is prevalent in northern India, which not only causes severe air pollution but also lead to numerous temporary and permanent health issues and even loss of lives. Bio-bricks or agro-waste based bricks is one such material that has the potential to not only create an alternative building material but also create new jobs at the grassroots level. This material has good thermal and sound insulation; it is breathable and helps in maintaining a comfortable living condition during harsh summer or cold winters. Following are a few highlights for the project:

- Reducing air pollution due to stubble burning
- Improving the income of the farmers
- Sustainable environment.
- Inexpensive and local building material for low-cost housing
- Making villages self-sufficient (Atmanirbhar) in building materials.

Guard Cabin Design

As a part of the BUILD project to demonstrate the material and its properties, a prototype of the guard cabin will be designed and executed in the space allocated by the IIT Hyderabad authorities. This sample building will be made

up of entirely of Bio-Brick material with supports from the bamboo framework. The roof structure will be made up of corrugated aluminium sheet with Bio-Bricks panel underneath to reduce the heat gain. The outer side of the wall will be lime plastered up to a height of 5 feet to protect the Bio-Bricks from rain. The whole structure is built on a PCC raft to protect the base from rotting and any damage from insect and rodents.

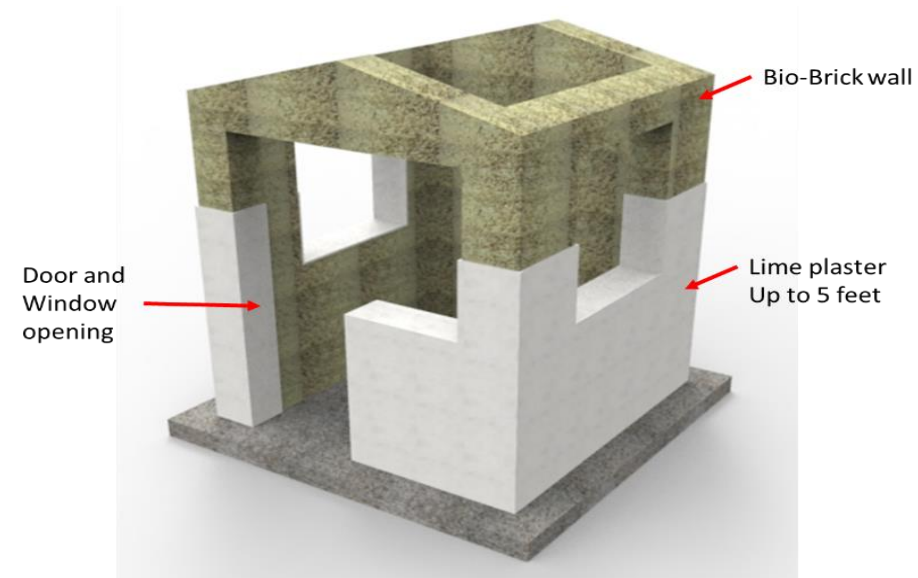


Figure 18: Complete Bio-Brick wall with lime plaster on the outer surface.

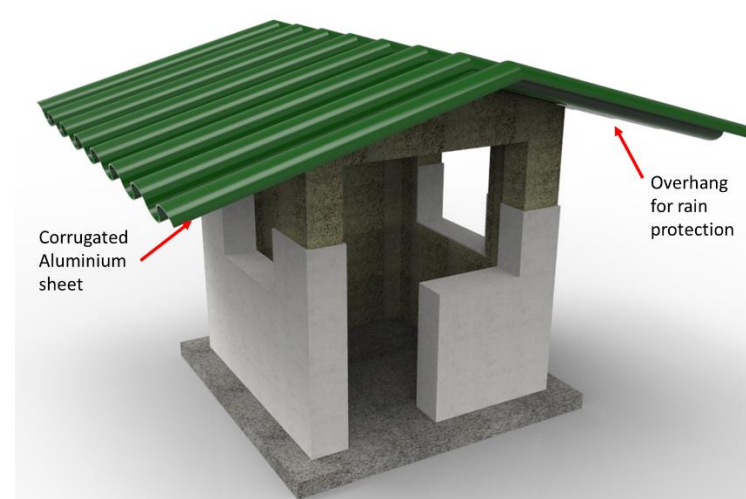


Figure 19: All side overhanging roof with corrugated aluminium sheet



Figure 20: Bio-Brick panels to reduce heat gain

Continued...

Paper Published

- First Paper published in ICED conference 2019 – Rautray, P., Roy, A., Mathew, D. J., & Eisenbart, B. (2019, July). Bio-Brick-Development of sustainable and cost-effective building material. In Proceedings of the Design Society: International Conference on Engineering Design (Vol. 1, No. 1, pp. 3171-3180). Cambridge University Press.
- Second Paper selected for ICoRD 2021. Bio-Bricks: Circular economy and new products
- Priyabrata Rautray¹[0000-0002-5260-0900], Avik Roy², Deepak John Mathew¹, and Boris Eisenbart³
1 IIT Hyderabad, 2 KIIT Bhubaneswar, 3 Swinburne University Melbourne

Awards

The research team received a Special Recognition Trophy for sustainable housing at Rural Innovators Start-Up Conclave 2019 organised recently by National Institute of Rural Development and Panchayati Raj (NIRDPR), Hyderabad.



Figure 21: RISC 2019 recognition for Bio-bricks

Mr. Priyabrata Rautray
(Architect and Product
Designer)
(PhD Scholar)
Department of Design



Amicrobe Herboceuticals - Therapy by nature

Vision of Founders

We (Dr. Shivakalyani Adepur and Dr. Mudrika Khandelwal) are researchers at IIT Hyderabad whose interdisciplinary approach to target the prevalent infections, specifically fungal infections in women, have led to a powerful technology. We have received a BIRAC biotechnological ignition grant to take the technology to prototype, as a result of which we have pre-incubated with the support of i-TIC. We are committed to improving the quality of life by modern material scientific intervention developing on the common Ayurveda knowledge.

We are living in a world where Allopathic antimicrobial drugs are ruling the healthcare system given the increasing incidence of infections. Although allopathic antimicrobial drugs have proved to deliver definite pharmacological action, nevertheless they are associated with the drug resistance and side effects too. The ancient Indian Ayurveda has a plethora of antimicrobial drugs which can help to cure and mitigate most of the infections with least resistance. However, no product based on herbal drugs exists in the market which is substantially equivalent to allopathic formulations (tablets, syrups etc). This is because the herbal medicines are sensitive to light, moisture, pH and environment and their bioavailability is very limited.

Hence, our vision is to design and develop safe and efficacious ancient Indian ayurvedic medicines into a modern formulation system by materials intervention which can resolve the problems associated with the stability and bioavailability of herbal drugs.

We aim at developing the herbal antimicrobial products (anti-bacterial and anti-fungal)

focused on the prevention of infections in day to day life. We are at TRL3-4 and would like to work for developing various possible products (feminine hygiene, aerosol sprays & transdermal patches) to get into the market and serve the society for the betterment of their health.

Technology developed by the startup

Fungal infections are prevalent, and in particular, its infestation as Vaginal Candidiasis in women is quite prevalent. These infections not only make a presence at work and travel uncomfortable for women but also sometimes cause them to drop from their careers. The treatment of the infections involves ointments and suppositories. These forms of medications require frequent applications given the low residence time. This makes fungus slowly resistant. Another similar scenario is that of an athlete's foot or soldier's foot where the foot is covered in a moist and warm environment for a prolonged period. Both of these situations need a solution that provides active protection and mitigation. We intend to target the former issue on priority.


The product we are working is a pantyliner that is incorporated with herbal microcapsules to impart antifungal activity. The liner would offer sustained release of oils for about 8 hours. 8 hours is the maximum duration of usage of a pantyliner, while at work or travelling. The usage of these pantyliners would prevent the infection and contain the existing. Further, these microcapsules can also be incorporated into various cosmeceutical products for preventing infections.

Our product/technology adds value in the following ways:

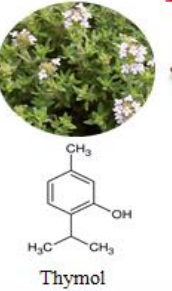
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1. There are no other pantyliners in the market which offer or claim antifungal activity, although fungal infection is the major class of infection in women.
2. Our formulation of essential herbal oils would expand the utility and efficacy of these known antimicrobials (including antiviral which has gained importance due to the pandemic).


Proposed Solution



Carvacrol



Thymol



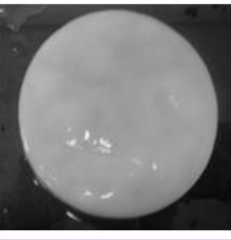
Eugenol

Herbal Oils – Carvacrol, Thymol and Eugenol
Excellent antifungal, no antifungal resistance
Synergistic activity: C:T:E (1:1:1) = C:T (2:1)

But...

- Thermo & Photo sensitive
- No stable formulation
- Needs a matrix to reduce dose & frequency

BC matrix loaded with oil microcapsules in the form of a panty liner



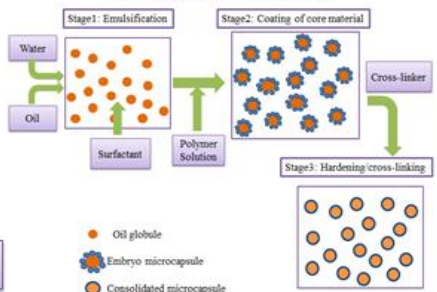
Bacterial Cellulose

Synthesis of microcapsules

Stage1: Emulsification

Stage2: Coating of core material

Stage3: Hardening cross-linking



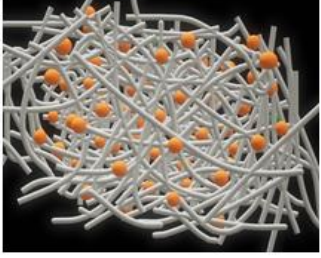


Figure 22: Proposed Solution by Amicrobe Herboceuticals

Detailed Technology

Our technology (for which we have filed the patent) is a modern delivery formulation of herbal antimicrobials essential oils derived from Tulsi, Oregano, and Clove. We were able to achieve a very high-efficiency microcapsule with an encapsulation efficiency of over 85% and a narrow size distribution. This required rigorous optimization. A coacervation phase separation method was used where droplets were stabilized in water and a polymer was used to create the shell, leading to microcapsule formation. These microcapsules can be either directly used as sprays or incorporated into a

carrier matrix for a double barrier release, depending on the application. The qualitative and quantitative antifungal activity has been performed to prove the efficacy better than commercially available antifungals.

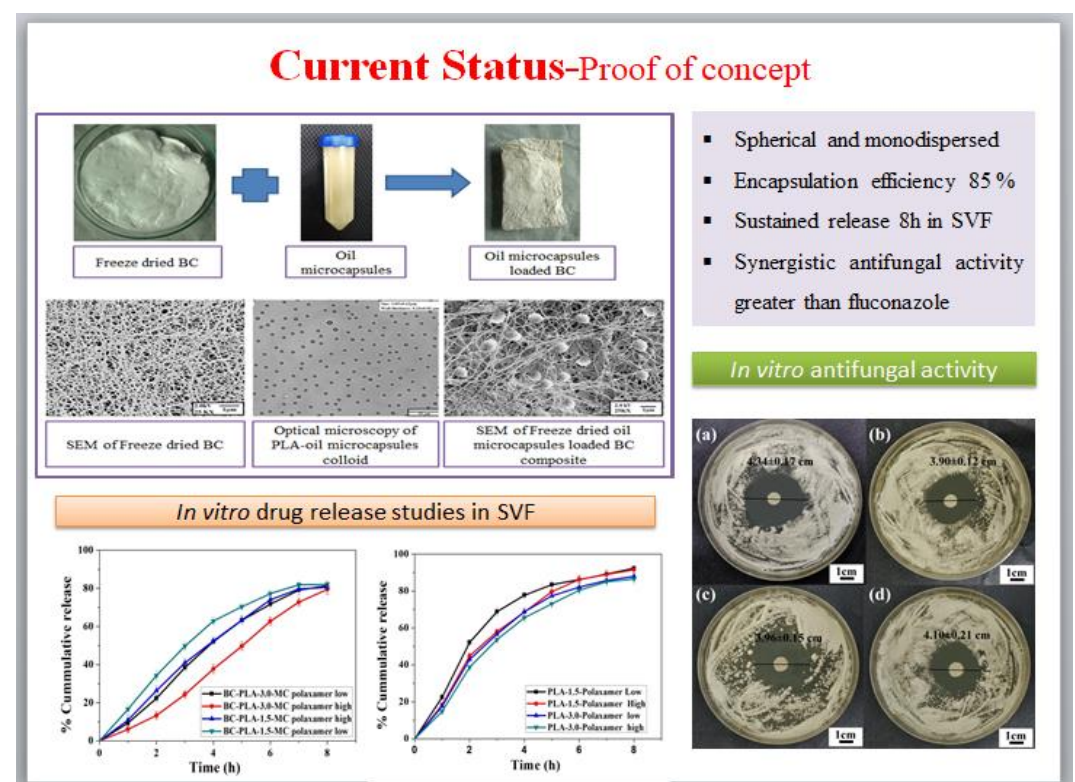


Figure 23: Current Status (Concept Proof) by Amicrobe Herboceuticals

Dr. Mudrika Khandelwal
Associate Professor
Department of MSME
Co-founder
Amicrobe Herboceuticals
i-TIC Foundation



Dr. Shivakalyani Adepu
IITH PhD Alumni
Department of MSME
Co-founder
Amicrobe Herboceuticals
i-TIC Foundation



Be able with BeAble

Center for Healthcare Entrepreneurship (CfHE) was established in the year 2015. The first batch of fellows was accepted into the Fellowship in Healthcare Entrepreneurship (FHE) program in July 2016. And by August 2016 began the journey of polishing future healthcare entrepreneurs. Dr. Renu John and Dr. Mohan Raghavan who was heading the fellowship program along with the Dr. Subha Narayan Rath, Dr. Aravind Kumar Renagan, Dr. Falguni Pati faculty at Department of Biomedical Engineering worked towards laying the initial knowledge foundation of healthcare as a segment. With invited experts, the fellows were trained in Bio-design process, product design, sketching, prototyping tools, regulatory aspects, product commercialization and all other skills and tools necessary to survive as a healthcare entrepreneur.

Then began the 6 months of clinical immersion, at partner hospitals such as Kamineni Hospital, Asian Institute of Gastroenterology, opened their doors to the fellows to observe the clinical setup, procedures and to identify the problem areas and needs. With the fundamental skill of observation and the knowledge and skills imparted during the fellowship, the fellows identified a ton of problems in the healthcare ecosystem. With so many problems at hand, it was difficult to understand which problems to solve. With the biodesign process, the fellows were able to identify their top needs, and these were validated again at the clinical setups and also with invited experts. With this began the process of finding solutions to the top 3 needs.

These involved burning the night oil at the labs, prototyping, testing, learning for faculties and students on campus to come up with an MVP. The MVP had to undergo many iterations based on the feedback of the clinicians. This MVP was validated at the hospitals with the clinicians.

The fellows now spent time turning their solution into a business by figuring out the business model, the financial model around it, and working on their pitches for Demo Day. The Demo Day invited a jury of investors, subject experts who would evaluate and give a go-ahead to the solutions which had the potential of turning into a business.

On the first-ever Demo Day of CfHE, 5 fellows demoed 4 solutions, and 2 solutions were selected for the next step. The selected solutions formed a company each and thus BeAble Health was born in November 2017. The company was incubated under CfHE, with the founders being Habib Ali and Sreehari KG. Sreehari was pursuing his PhD in Design at IIT-H.

The Stroke is considered as one of the leading cause of disability in India & the world. More than 1.8 million cases of strokes are reported in India. More than 80% of patients suffer weakness or paralysis of one side of the body. Traditional therapies are insufficient for patients suffering from a stroke. Conservative therapies in hospitals or homes will last for three weeks or more. One to one session in hospitals and physiotherapy is recommended for the survivors by the neurologists.



Figure 24: Working Prototype of BeAble

Continued...

Basically, an average of 30 repetitions of movements are given for the stroke patients every day, but higher repetitions are suggested by researchers which range 400- 600 repetitions per day. The current systems existing in the market place are mostly imported. ArmAble is the first product which is made in India.

The ArmAble is a unique amalgamation of design and technology. It is simple, yet sophisticated. It is a game based arm rehabilitation device for a patient with upper limb neuromuscular disorders. The games which ArmAble provides are made keeping in mind the culture of India so that people can relate to it. The device tracks the movements of patients and shows them their improvement every day, which motivates them to perform more therapy. The device also helps therapists by reducing their workload and help in delivering quality therapy. Engaging a patient in therapy is a huge task. With the use of ArmAble patients got interested in therapy for a longer time and performed higher repetition.

The game-based design helps the patient to do multiple joint movements in multiple directions and multiple ranges, which is a revolutionary thing in Rehabilitation. BeAble Health has won many grants, accolades and awards both in India and Internationally. With the constant mentoring and support from CfHE BeAble Health was able to identify a strong need and conceptualize an appropriate solution.

The strong research foundation and a significant

grant from BIRAC under the guidance of IKP Hyderabad have accelerated our journey to the product.

Mr. Habib Ali
Founder & CEO
BeAble
Centre of Healthcare &
Entrepreneurship



Mr. Sreehari KG
Co-Founder & CMO
BeAble
Centre of Healthcare &
Entrepreneurship



nLite360° to heal neonatal Jaundice by HeaMac

Our journey of entrepreneurship started at CfHE, IIT Hyderabad through the Bio-Design Fellowship, which is a DST recognised innovation centre providing mentors and support for R &D. It is a one year program which brings entrepreneurs, engineers, clinicals and the business community on a single platform. During this fellowship, we have undergone intense clinical immersion and have understood the healthcare needs of the present-day society.

The team completed 1 year of healthcare entrepreneurship fellowship that includes clinical immersion, need identification and validation through a well-established Bio Design process at IIT Hyderabad in Government and private set-ups in India. Both the founders of Heamac had an affinity towards the neonatal needs. We spent around three months on finding out needs in neonatal and maternal care, after finding out problems from our observations we had identified our need area as neonatal jaundice management and worked on a system which suits both government and private setups. We spent 350 hours in focused immersion and worked for three months on building over 50 concept explorations. This was funnelled out to one viable concept that has been developed into a demonstrative proof of concept.

Because of the incubation at CfHE our initial journey of entrepreneurship was smooth. The fellowship program helped us to see and understand the clinical needs of ourselves. We were able to meet the doctors and clinicians in person. During this program, we understood that there is a need for a dynamic device to treat neonatal jaundice and have developed the product nLite 360.

Heamac is co-founded by Prasad Muddam, an Industrial Designer and Mechanical Engineer

with 10 years of experience working with the neonatal field designing and developing medical devices right from prototyping to marketable products and Akitha Kolloju, Biomedical Engineer with a masters degree and hands-on experience in biomedical product prototyping.

Our product “nLite-360” is a smart and modular Phototherapy device which provides graded phototherapy for jaundice newborns. We are developing a solution which is suitable for the NICU settings and the resource-constrained settings. It provides efficient treatment at reduced power intake and in reduced time. It also provides continuous treatment to the baby even during breastfeeding and Kangaroo Mother Care.



World's 1st INTELLIGENT Phototherapy System

Intelligent Therapy



Provides customized therapy as per the risk level

Portable



Battery pack enables Home therapy

Embraceable



Promote Kangaroo care & Breastfeeding



Figure 25: Brief about nLite360°

Continued...

We have our manufacturing and distributing partners, Nice Neotech Medical Systems, from Chennai. We have received the funding support from BIRAC through the BIG Birac Call. We have the mentoring support from IKP Knowledge Park who is our BIG Partner. We have clinical partners from Kamineni MNR and Neloupher Hospitals.

Some of the notable achievements we received throughout our journey of entrepreneurship like:

- BIG Birac Grant. Birac Women In Entrepreneurial and Research (WInER) award.
- Best early-stage startup award at IKMC 2020 organized by IKP. Winners at the Healthcare summit 2020.
- DMA award in the Healthcare sector. Winner of the 3M Young Innovators Challenge
- One of the top 5 nominees of the Lexus Design award
- We are one of the top 5 finalists of the DivHERsity awards.
- We are in the Top 5 of the BioAsia 2020 finalists.



Figure 26: Team HeaMac during field exploration, understanding the problem Statement



Figure 27: Team HeaMac from their Workstation at CfHE, IIT Hyderabad

Ms. Akitha Kolloju
Founder
HeaMac
Centre of Healthcare &
Entrepreneursip



Mr. Prasad Muddam
Co-Founder
HeaMac
Centre of Healthcare &
Entrepreneursip



Adore the gift of Parenthood by Nemocare

Parenthood is believed to be one of the biggest joys in the world, and every new parent wants nothing more than a healthy baby. Baby Rajesh's parents too were ecstatic when he was born, but their joy was short-lived when they found that Rajesh weighed less than a kilogram at birth. Chances of survival with such low birth weight were close to impossible. Baby Rajesh's parents were overjoyed when Dr. Jagdishwar saved their baby miraculously. But it was not the end of the road for baby Rajesh. Two years later, he was diagnosed with cerebral palsy, presumably due to multiple apnoeic episodes in the time he spent in the hospital fighting for survival. If only Dr. Jagdishwar had some way to tell him the distress baby Rajesh's fragile body was undergoing, timely medical intervention could have been done. Now, baby Rajesh has to spend his life as a cerebral palsy patient.

This incident jolted Manoj Sanker and Pratyusha, bio-design fellows (2016 batch) at the Centre for Healthcare Entrepreneurship at IIT Hyderabad, to think how they could provide a solution to doctors like Jagdishwar to monitor patients at critical junctures and ensure they receive timely help and his nursing staff to improve their efficiency and help them do their work better. For parents like the Rajesh's ones who can now sleep peacefully at night knowing that their baby is taken care of.

They witnessed how nurses and doctors do their best within the limited resources available to them, especially in neonatal care where they resort to visually monitoring the babies for any signs of distress. Both spent a lot of time in the hospitals in Telangana trying to understand the pain points of all the stakeholders including patients, doctors, and nurses involved in the healthcare system.

NemoCare Wellness aims to end all preventable neonatal and maternal deaths in the developing world by building innovative affordable, accessible, highly accurate monitoring solutions for the emerging markets. We use unobtrusive wireless wearable sensors and networks, analytical algorithms and big data as tools to provide continuous, high-resolution monitoring and preventive care for every patient in the hospital and at home - making sure that no stone is unturned to prevent any form of mortality and morbidity, especially at the bottom of the pyramid. We use design thinking principles to build life-saving technologies that will transform the way healthcare is delivered.

Globally, three million babies die in their first month of life every year, and 98% of these deaths occur in the developing world. In India, approximately 3.6 million premature babies are born every year and out of them, 40000 babies die. Premature babies are susceptible to a variety of life-threatening conditions such as apnea, hypothermia and respiratory distress – causing either death or some form of morbidity. Almost all of these deaths are preventable with timely treatment.

However, hospitals in the developing world are severely challenged by limited resources. They cannot afford the expensive equipment, which is usually bulky and unsuitable for continuous monitoring. Moreover, they have a high rate of false alarms; forcing nurses to visually monitor the babies. In low resource settings, where one nurse cares for about 40 babies, she will not be able to give equal attention to every baby. Most distress conditions often go unnoticed, causing irreversible injury to the newborn and sometimes even lead to death.

Continued...

If a child has to be monitored continuously, they have to be isolated and hooked to wires – which hinders breastfeeding and kangaroo mother care – which in turn hinders growth and recovery. Visual monitoring of so many babies leads to a drastic decrease in efficiency of nurses and doctors which is not a good state to be in when they have to attend to emergencies. Based on the same thought process we spent a good 10 months, working closely with all the stakeholders, designing and developing the prototype, partnering with key players for piloting our device, working with vendors and identifying manufacturing partners. Our flagship product -the Nemocare Raksha is an IoT enabled smart wearable on the baby's foot which monitors all key vital parameters noninvasively that will provide a comprehensive picture of the baby's health.

The data is then transmitted to the cloud, which can be accessed at a central monitor by which the nurse or doctor can continuously and remotely monitor all the babies through a single interface. The entire system along with Nemocare's proprietary deep learning algorithm works as an intelligent platform that will track the baby's health in the most accurate way possible and give only insightful notifications and alerts to healthcare workers to enable timely intervention when a distress condition is detected. This platform collects, stores, visualizes and analyses the data generated, enabling a paradigm shift in clinical diagnostics and preventive care through a data-driven approach. Inherently, the data is used in real-time to provide early warning scores and other predictive indicators and used offline to develop new predictive algorithms.

We have to encourage the doctors and caregivers to step out of the comfort zone of

traditional practices and explore methods that will make them more efficient at what they already do so well. By building cutting edge technology that is designed to be user-friendly, intuitive and less skill-intensive, we will be able to achieve faster adoption rates. Such technology is born, when engineering and design work hand in hand. The co-founders are a multi-skilled technologist and an industrial designer respectively and they use design thinking practices to build cutting edge technology and make it really simple to use. They believe it as their secret sauce to disrupt neonatal and maternal care.

Nemocare sees the huge potential in the area as the market size for baby monitoring devices is USD 1.2 billion for India alone. The Asia-Pacific and Indian baby monitor market is growing at 11 percent CAGR – owing to the rise in the amount of disposable income and number of working parents. There are 120,000 Hospitals (private nursing homes and corporate Hospitals) and 1500 public health centres that cater to 25 million babies that are born every year. This makes a total addressable market of USD 5.1 billion. Nemocare's work is funded by global funding agencies like the Bill and Melinda Gates Foundation, BIRAC (Govt Of India initiative), Axilor Ventures and Department of Science and Technology.

While the primary customer segment is the domestic market, there is also a huge potential to grow into foreign markets including Asia, Africa, the Middle East, and Europe. The first priority outside of India will be African markets as the need exists there as well and also a perfect setting for a facility-based product like ours.

Continued...

We have also been part of prestigious global accelerator programs like GSBI-Miller Center for Social Entrepreneurship, Qualcomm Design in India Challenge and Mass Challenge, USANemocare was adjudged the winner of the Asia Hardware Battle 2019 and is recognized under Startup India Program and Niti Aayog initiatives. Nemocare was Listed in top 50 disruptive innovations in India 2019 by Yourstory.

We were recently featured on TechCrunch as 'Wearables to help newborns stay safe' during the global pandemic times when safety was everyone's highest priority.

<https://techcrunch.com/video/nemocare-wearables-to-help-newborns-stay-safe//>



Figure 28: Team Nemocare at an exhibition demonstrating the product and concept.

The company has patents filed globally and has a strong IP portfolio pipeline that will be its strength and key to market share capture. Currently, the company is doing scale-up pilot studies for evidence creation and regulatory clearances with two public hospitals and two private hospitals. We intend to explore the consumer market for other baby monitoring innovations. With Covid bringing in more awareness about healthcare and telemedicine becoming mainstream, we believe our product fits perfectly to ensure newborns get the much-needed attention they deserve during a global pandemic.

Hiring new talent to expand our team, seeking out mentorship, financial guidance and business plan development have all been a part of our roller coaster entrepreneurial journey, but we have been efficiently guided by our mentors at CfHE. The centre gave some good technical mentors and incubation space where we could start our operations. Our sincere gratitude to Prof Renu John(our Technical Advisor. HoD Biomedical Engineering and Head CfHE) for his constant support and guidance to give our best. We also take this opportunity to thank the director, Prof Mohan Raghavan, Dr Subha, Dr Aravind and the entire CfHE and IITH fraternity for handholding us through this roller coaster journey and giving us a strong foundation. CfHE has a curated curriculum that exposed us to best practices in IP, Regulatory, Product development, Corporate affairs, Clinical Immersion and Business aspects curated for first-generation MedTech entrepreneurs like us. We envision to save the lives of 1 million newborns and soon be a part of India, rather the world where no baby ever dies of a completely preventable cause.

Continued...



Figure 29: A baby with Nemocare 'Raksha' Device

Mr. Manoj Sanker
Co-Founder
Nemocare
Centre of Healthcare &
Entrepreneursip



Figure 30: The working prototype of Nemocare 'Raksha'

Ms. Pratyusha
Co-Founder
Nemocare
Centre of Healthcare &
Entrepreneursip



Cherish the Campus Life

Hello, I am Akshita (ES16BTECH11012) from ES Cass of 2020. I am a social person and up for a conversation about anything. I have always been interested in Electrical engineering focusing on its biomedical application which motivated me to specialise in EE with a minor in Biomedical. I look forward to pursuing a career in developing and improving devices for Biomedical applications.

Back in 2016, IITH being ranked #7 in NIRF ranks sure grabbed a lot of attention. That is when I dug a little deeper and found out the unique Fractal Academic pattern, which seemed like a perfect curriculum for me. Then I found out about the even more unique program Engineering Science which is designed to cover a lot of breadth in terms of Engineering Skillsets simultaneously inculcating the depth knowledge in a field or fields of choice, which is called the T-education. This was the moment I decided I want to IITH where one can be, as ES calls it, Jack of all and Master of One.

I have enjoyed any math-intensive course very much and disliked anything which needed me to write code. But coding is an essential skill irrespective of whether you are in CS or Material Science, it helps one implement the physics and math they learnt for real-life applications.

I would like to say I was one of the most active students on campus. I was part of the TEDx team in my first year. NSS, Sunshine, fest and clubs in the second year. I was also Media Secretary in Student Gymkhana in my third year and Sunshine Head in my Final year to give back to the institute which gave me tons and tons of opportunity to grow both personally and professionally.

I have learnt to operate FLIM equipment and single-photon microscopy from Dr. Naresh Emani's Lab through one of his dedicated PhD students Ms. Jinal Tapar. Along with that I also learnt various computational and simulation techniques and improved my presentation skills.

I am currently going through the visa process to start my graduate program at Purdue University starting in Jan'2021. My experience at Dr. Emani's lab helped me secure the admit and also helped me choose my specialization for Grad school.

There are plenty of good and bad moments during my life at IITH. Though the best moment was hosting events on campus and Dean Academics asking me to host the Convocation in 2018, which I, unfortunately, had to turn down as I was in Japan attending a workshop at that moment.

Being a little relaxed is okay but do not miss out any opportunity campus has to offer. Personal development is as important and professional development as experienced by many students who went through HR round during placements.

Faculty and fractals are both the best part of IITH. They are both flexible and understanding. Though the administrative part can be streamlined as there are no defined set of instructions and a rule book to refer to for queries and requests. We have always depended on our seniors to enquire about issues as the Senate rules were also not open to students till recently.

Continued...

I am active on LinkedIn, my handle is Akshita Ramya Kamsali. Or shoot me an email on the Insti ID es16btech11012@iith.ac.in or akshitakamsali@gmail.com

Thank you for the opportunities, I have had throughout my time on campus.

Enjoy your life to the fullest

I am Isha Goel, coming from the town of Rishikesh. I did my bachelors from BITS Pilani and M.TECH from IITH in medical biotechnology. I am currently pursuing my PhD from The University of Tokyo in Bioengineering. Other than the research I like visiting new places and trying out clichéd photography.

IITH rose from nothing to a well distinguished University both metaphorically and literally. The small size of the batch for masters and its relations with Japan made me join IITH.

I enjoyed studying Molecular Mechanics the most. It was a new subject for me, and I loved the enthusiasm of the instructor, Dr. Raghavendra, for teaching.

Nothing much other than studies. Sometimes I would hang out with my friends for dinners and outings. I worked in Prof. Anindya Roy's lab. We worked on DNA repair and I learnt all the molecular biology, from bacterial culture to cloning of genes and protein expression in the lab.

In my current lab, nobody really knows Molecular Biology since they are all

Ms. Akshita Ramya Kamsali
Class of 2020
BTech ES with Minor in
Biomedical Engineering



bioengineers. So, when I needed it, there was no one, in particular, to guide me. That's where my master's training helped me. Moreover, it creates a good impression here that I know all those experiments.

There are a lot of good moments. The walks in ODF campus, moving from ODF to Kandi, and hanging out in the pod, hanging out in the balcony during the storms. They were all some of the best moments of my IITH life.

We saw the Kandi campus growing in front of us like a baby from just two buildings to so many now and always making something better than before.

Just enjoy your life to the fullest and get all the knowledge you can get. Enjoy the hostel life. All the universities have such good hostels. Visit Sangareddy often!

The campus and its ever flexibility is always trying to get the newest of the things, technology, buildings are the best part about it. I still think there can be an improvement in management.

Continued...

I remember the spams we used to get in email. As much annoying they were, the reasons were almost always genuine like taking care of dogs, mess food issues, blocking the emails of students who spam for cab sharing etc.

I can be contacted at isha02b1@gmail.com

Ms. Isha Goel
Class of 2018
MTech
Biotechnology



Looking at research-oriented Curriculum, come to IITH

Hi, I am Shivani, currently working as a Research Associate in Sysmex Cooperation. I pursued my PhD from The University of Tokyo and graduated in September 2020. I did my MTech for IITH, Biotechnology Department and graduated in July 2017.

I heard from my seniors that the Biotechnology Department in IITH has a young faculty and are open to new challenges and even new research areas. Considering these facts, I selected IITH.

I enjoyed most of the subjects taught at IITH, as the courses are different and research-oriented. I haven't seen such a curriculum in other Universities. However, I didn't like that the program of assigning labs for the Master's project. I faced many difficulties when I was applying for my PhD because of that. I feel that everyone should be given hands-on training with Wet lab and Dry lab because the Master's project defines your future.

Biotechnology was a small and relatively new Department in IITH. Therefore, we didn't have the opportunity to have hands-on experience with most of the experiments. However, we were given the basic knowledge about the various experiments and the results obtained by the seniors.

I recall the moment of being shifted from ODF to Kandi as my best memory from IITH.

I would like to say to the current students to be sure what you want to do in the future either going for higher studies or going for a job. Don't try to sail on two boats, as you would be dividing your concentration into two things, and you would take the opportunity from some other person.

The curriculum is the best thing about IITH. I would like that the Master's thesis program should be changed for Biotechnology Department and involve both wet lab and dry lab experience to the students because the students will represent IITH, Biotechnology Department in the future and should be taught the best.

You can reach me out on Facebook.

Ms. Shivani Dixit
Class of 2017
MTech
Biotechnology



Keep working hard towards your goals with a determined mindset

Hi, I am Soumya Sethi, graduated from IITH in 2018, MTech Biomedical Engineering. I am pursuing my PhD from Kyoto University in DNA Nanotechnology. I am an avid sports player, love hiking and cycling in nature.

I joined IITH because of the interdisciplinary environment provided to the students, it has been a very enriching experience because the courses included students from bachelors, masters and PhD course which helped me gather so much knowledge and perception. This amalgamation of ideas and thoughts really helped me learn a lot.

I enjoyed Bio-nanotechnology and Tissue engineering the most, because the courses were very well designed to help us enhance our creative and innovative thinking, we were motivated to bring up our own ideas and design projects in a team which helped me understand how to develop and come up with ideas and plan projects. The subject I enjoyed the least was sensors and transducers.

In IITH, in the initial days I used to play basketball but eventually, the course work was too tiresome so I resorted to running and table tennis. I have had specialized training in culturing mammalian cells, 3D printing, DNA nanotechnology.

My education at IITH has enhanced my creative skills and has helped me able to think and work independently in my PhD, starting from

designing my own projects. Also because of the interdisciplinary environment provided by IITH, I am able to think out of the box and figure out the problems in my research more efficiently than my colleagues.

I have had numerous beautiful moments at IITH, it was my first ever experience to stay at the hostel so I would say I enjoyed that a lot, it was a very amazing experience to learn so much from people from various cultures and backgrounds. My lab life was exhilarating too, I got to learn so much from my seniors in the lab not only about research but also about life.

I would like to say that you are in a great place, along with your academics, enjoy the campus life and keep working hard towards your goals with a determined mindset.

You can contact me by email. My email id is - sethi.soumya.88s@st.kyoto-u.ac.jp

Ms. Soumya Sethi
Class of 2018
MTech
Biomedical Engineering



Pain is temporary but CGPA is permanent

I am an Alumni of the 2015 batch at IIT Hyderabad. Maharashtrian upbringing with my current family settled in Pune. Married to Nutan and blessed with a son Raghav. Optimistic about taking risks and challenges in life and like to explore. Vegetarian by choice with a pro-life outlook.

IIT Hyderabad was only 2 years old so not much data available at the time so the decision was made entirely on the founding team. Very proud of each and every faculty member of this esteemed institute.

Enjoyed the most - ICTD by Dr. Nimmi Rangaswamy, One of the most prominent researchers in Anthropology. Learned some of the most important aspects of life which I happen to use / recollect till date. Enjoyed the least - Material Science, The course core to chemical engineering and chemistry unfortunately has been my biggest weaknesses.

I was involved in robotics, movie club, fresher student mentoring, E-cell, extra mural lectures, Startup - PURE (still functional)

I was specialized in Thermal stream of mechanical engineering with a B.Tech and M.Tech Dual degree with honors and minor in entrepreneurship

IIT Hyderabad taught me to be a problem solver in life, it taught me hustle and most importantly result oriented work ethic. Today I come across multiple problems everyday to which I look forward and am able to solve most of them on my own.

The day we secured our first angel investment for our startup PURE was my best moment.

Two things I want to convey to the existing student folk @ IIT, Hyderabad:

1. IITH is very unique in letting you explore each and every aspect of activity happening in the world, make the best use to learn as much as possible academically or otherwise.
2. Pain is temporary but CGPA is permanent.

The best thing about IITH is its "T education" students get to know about so many different aspects of technology which is generally not possible in any institution.

IITH can improve on the industry interaction with academia for streams other than Computer Science.

Best way to reach out to me is either Call or whatsapp on 7506959447 and an email at sumeet92@gmail.com.

To all my peers, teachers and friends I want to sincerely thank you for everything that you contributed at IITH, life would not have been the same without you.

Mr. Sumit Jadhav
Class of 2015
BTech
Mechanical Engineering



Stay true to yourself, explore different opportunities

I consider myself as an avid integrator loving integration of disciplines, sports, and other sections of life. Athlete by nature and a food lover (experimenting with recipes). I graduated with different degrees in similar disciplines through my career (Electronics and Communication to start at BTech, Biomedical and then Electrical Engineering). However, graduate studies have been majorly focused on healthcare applications. Have explored countries, cultures, and cuisines that become part of my life now. I will be joining IMEC in Belgium as Postdoc Research Fellow starting January 2021.

The prestige of IIT that comes with the research infrastructure made me apply for one of the dream places. And IIT Hyderabad was growing when I was seeking to start my research career. The excitement of new IIT with fresh faces made me join then emerging IIT Hyderabad.

At IITH, I enjoyed a couple of subjects across disciplines. Biomechanics, Digital Signal Processing, Sensors and Transducers in healthcare. However, the most exciting was the Clinical Healthcare which had field visits helping understand the medical needs from both practitioners and consumer's perspectives. The least enjoyable subject would be Applied Mathematics which had a very small impact on my studies.

I had been involved in multiple extracurricular activities. The most enjoyable was representing IITH at Inter-IIT sports meet in cricket. Also had been part of different cultural and hostel teams helping and volunteering for workshops and public events.

Lab specific trainings relevant to cell culture which were new to me coming from electronics engineering background were specialized

training I had at IITH. During my master's thesis project, the literature review and the project work helped me pursue research career further. The motivation from faculty advisors (Harikrishnan N. Unni and Subha N Rath) had been instrumental as well.

Receiving "Academic Excellence Award" and being respected by all the peers and faculty across the university.

Stay true to yourself, explore different opportunities, and believe in your potential to excel beyond your immediate attentions. Highs and lows are part of life and no one can define you except yourself.

Healthy competition between departments is good however ego will hurt in long run. Faculty should be open to allow students take courses as their need in addition to a few mandatory core courses. And placement team needs to work in close relationship with industry and bring the best to hire the talent at IITH.

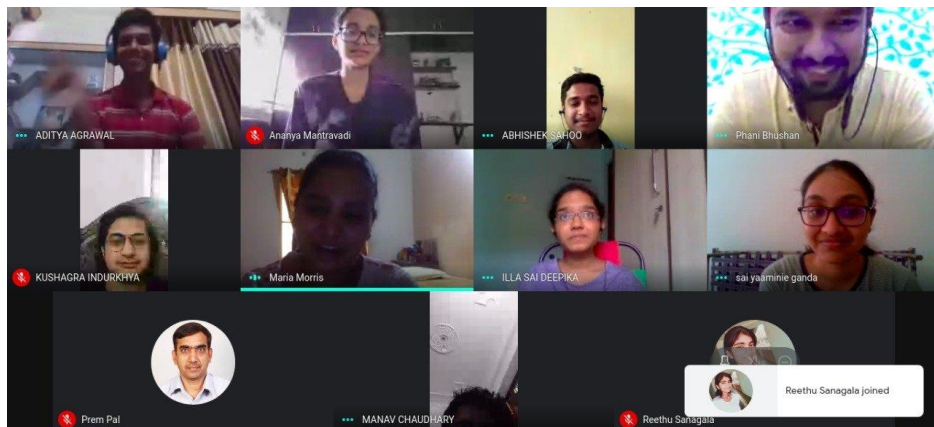
I can be reached at my personal gmail ssfaiza2@gmail.com and WhatsApp number +91-775 888 6998.

As an elite institute, more collaborations with international universities, tech firms and research labs will help secure amazing opportunities. Faculty shall provide ample opportunities to collaborate internally on projects as well which helps in cross culture exchange as well.

Mr. Sohail Faizan Shaikh
Class of 2015
MTech
Dept. of Biomedical
Engineering



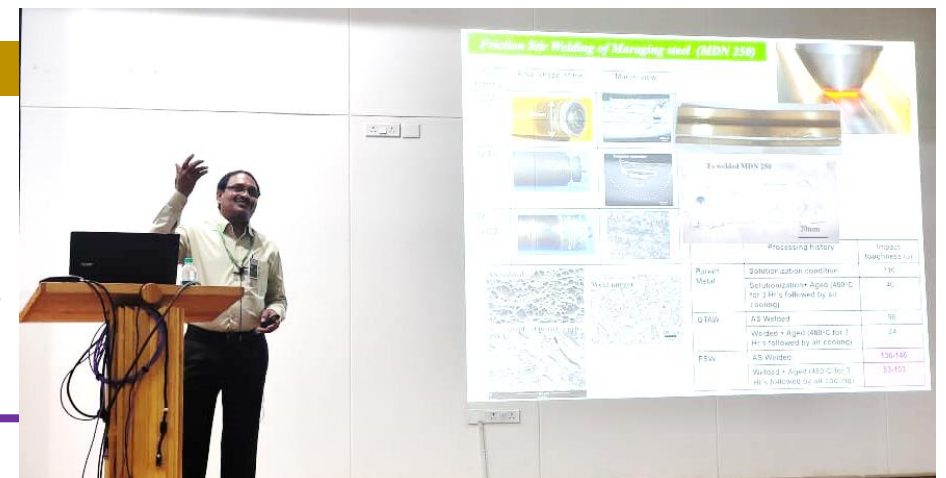
July, 2020



Sunshine - The Counselling Cell at IIT Hyderabad conducted a session for IIIT Raichur to bring together the students and faculty virtually to share their experiences in this lockdown and the things they were missing about their institute.

July, 2020

IIT Hyderabad delighted to host “8th Prof. EGR Distinguished Lecture”, delivered by Dr. G. Madhusudan Reddy, Director, DMRL, Hyd. jointly organized by MME Dept., IIT Madras & IIM Chennai Chapter on “Innovative Approaches in Joining of Advanced Materials”. 100+ attended it via live streaming



July, 2020



IIT Directors Round table E Conclave on National Building, discussed on various aspects like Brand IIT during Pandemic- SWOT analysis, Efforts taken by IITs for their students. Prof. B. S. Murty, Director IIT Hyderabad was among the admired panelist along with the Director of IIT Bombay, IIT Kanour and IIT Tirupati

July, 2020

Prof B. S. Murty, Director IIT Hyderabad, speaks with Dr. TV Venkateswaran in Rajya Sabha TV about the innovations & research undertaken by Institute to tackle the COVID-19 Pandemic



Continued...

July, 2020



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

IIT Hyderabad is pleased to host a webinar on COVID-19 & Lockdown impact on Corporate and students in association with Servicenow on 28th, July 2020 by Mr. Aditya Ramamurthy (Director-Platform Engg group, Servicenow). Follow the URL to join the session: <https://servicenow.zoom.us/j/91784568578/>

About the Speaker: Mr. Aditya is currently working as the Director-Platform Engg group, Servicenow, and he has the zeal to code and also runs the Maker's Lab at Servicenow, Hyderabad which builds innovative outcomes that showcase their Platform's power to customers and help to propel innovation.



Mr. Aditya Ramamurthy
(Director-Platform Engg. group, Servicenow)

IIT Hyderabad has hosted a webinar on COVID-19 & Lockdown impact on Corporate and students in association with Servicenow on 28th, July 2020 by Mr. Aditya Ramamurthy (Director-Platform Engg group, Servicenow).

July, 2020

IIT Hyderabad Researchers use corn husk to produce #carbon electrode for high-voltage supercapacitors. Their activated carbon electrode showed better energy density than conventional supercapacitors



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

in collaboration with International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI)
An Autonomous R&D Centre of Dept of Science & Technology, Government of India

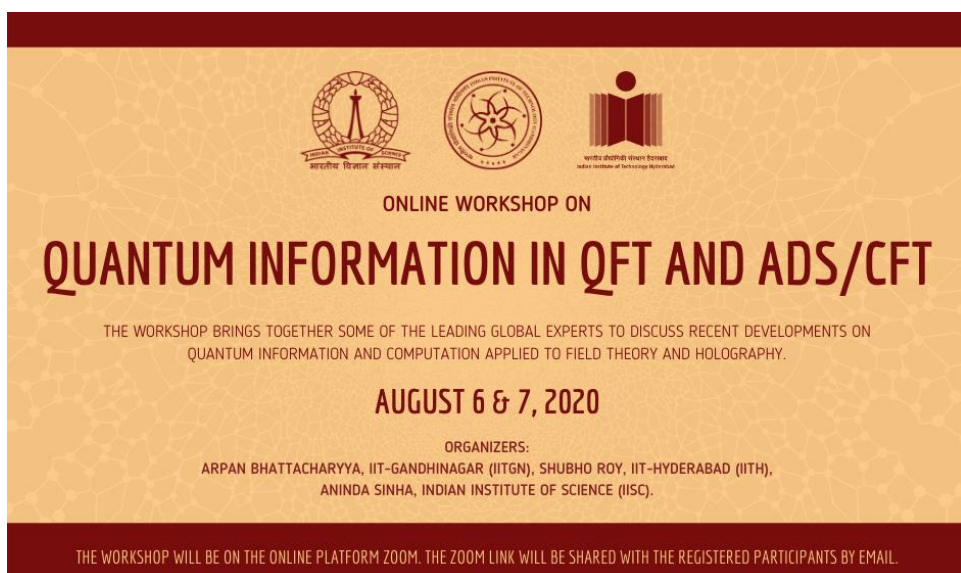


Uses corn husk to produce carbon electrode for high-voltage Supercapacitors



Nanaji Katchala
Usha Rani Malothu
Dr. Tata Narasinga Rao
Dr. Atul Deshpande

Aug, 2020



ONLINE WORKSHOP ON
QUANTUM INFORMATION IN QFT AND ADS/CFT

THE WORKSHOP BRINGS TOGETHER SOME OF THE LEADING GLOBAL EXPERTS TO DISCUSS RECENT DEVELOPMENTS ON QUANTUM INFORMATION AND COMPUTATION APPLIED TO FIELD THEORY AND HOLOGRAPHY.

AUGUST 6 & 7, 2020

ORGANIZERS:
ARPAN BHATTACHARYYA, IIT-GANDHINAGAR (IITGN), SHUBHO ROY, IIT-HYDERABAD (IITH), ANINDA SINHA, INDIAN INSTITUTE OF SCIENCE (IISc).

THE WORKSHOP WILL BE ON THE ONLINE PLATFORM ZOOM. THE ZOOM LINK WILL BE SHARED WITH THE REGISTERED PARTICIPANTS BY EMAIL.

IIT Gandhinagar, in association with IISc Bangalore & IIT Hyderabad has organised a two-day online workshop on 'Quantum Information in QFT and AdS/CFT' on August 6-7.

Aug, 2020

Challenges of conducting JEE amid COVID-19 & how smartly IIT Hyderabad is adapting to the changing scenario IITH's Director Prof. B. S. Murty has discussed during a candid interview with Mr. T. S. Sudhir for his popular talk show 'Filter kapi'.



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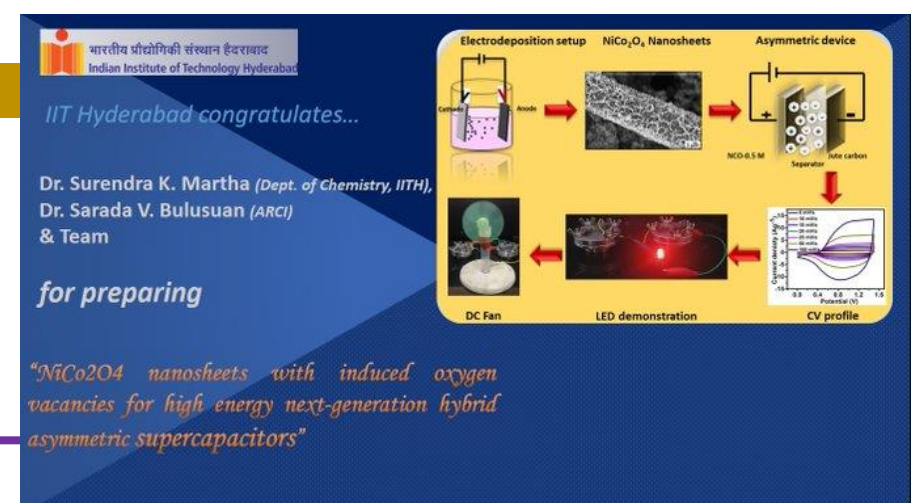
Aug, 2020



Difficult to say but delighted! IIT Hyderabad bid adieu to graduating (PhD, PG & UG) students of 2020 via an E-farewell on 8th and 9th of Aug. IITH wishes best for their upcoming life.

Aug, 2020

Dr. Surendra K. Martha Dept. of Chemistry, IITH, Dr. Sarada V. Bulusuand from ARCI and team has prepared NiCo2O4 nanosheets with induced oxygen vacancies for high energy next-generation hybrid asymmetric supercapacitors.



Aug, 2020



Deakin-IITM-IITH Centre of Excellence in Advanced Materials and Manufacturing has successfully hosted an Intl. e-workshop on Integrated Computational Materials Engg. Speakers include industries' experts Tata Steel, GE, TCS, ANSYS, DMRL & premier inst. Deakin, IITs, IISc, Anna Univ.

Aug, 2020

IIT Hyderabad in joint collaboration with NRDC & NITIE hosted a unique webinar on 'Intellectual Property & Innovation Management for Startups through Academia-Industry Collaboration'



Continued...

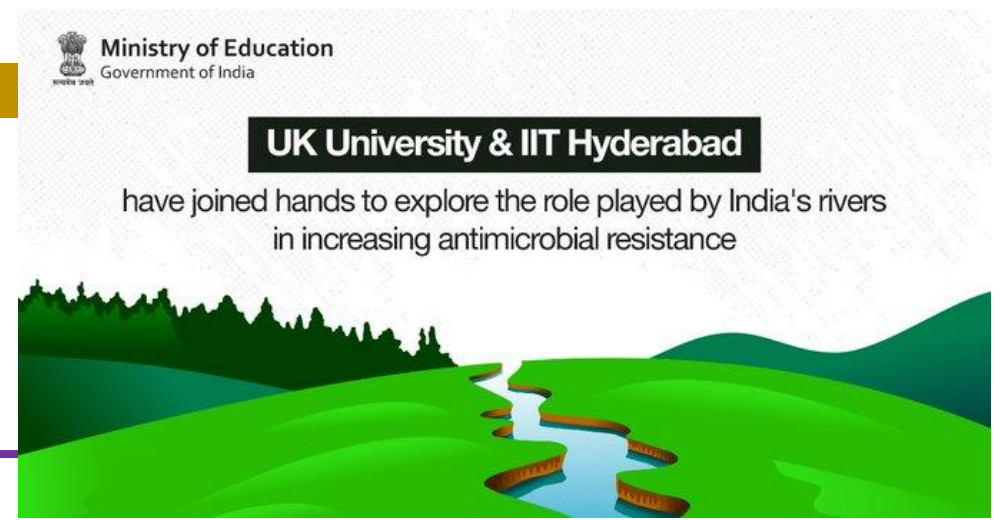


Aug, 2020

IIT Hyderabad celebrated 74th Independence Day. Event is being broadcasted live with min. possible gathering in view of COVID-19.

Aug, 2020

IIT Hyderabad & UK University has collaborated to study the impact of antibiotic disposal in Indian waterways that maybe posing a severe threat of spreading fatal infections.



Aug, 2020



EBSB Club at IIT Hyderabad & IIIT Raichur has organized mandala art contest to bring out one's inner talent. Here are the winners. IIT Hyderabad congratulates all the winners.

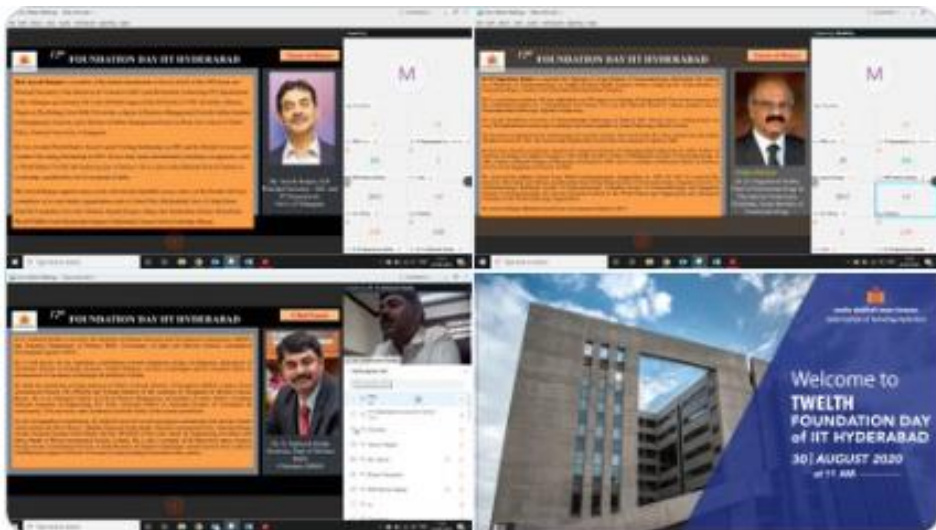
Aug, 2020

India's local innovation brings N95 equivalent protection at Rs.13/day only. IIT Hyderabad's @CfHE start-up Usafe Healthcare has launched the world's most affordable respirator mask 'US9TM' in an e-event by Shri Jayesh Ranjan, IAS, Principal Secretary to Govt. of Telangana.



Continued...

Aug, 2020



IIT Hyderabad celebrated its 12th Foundation Day. Become an exporter of technology from an importer of technology, self-resilient and work to towards making “Atma Nibhar Bharat” said by Dr. G. Satheesh Reddy, Chairman DRDO, Chief Guest of the event.

Aug, 2020

IIT Hyderabad’s incubated startup has won a fully sponsored research collaboration deal with Japan firm Technocorpus for manufacturing Internet of Things based smart home products.

Ministry of Education
Government of India

IIT Hyderabad's Incubated Startup

Tie-up with a Japanese Firm to Manufacture Smart Home Products



Sep, 2020



‘E-Waste is not a Waste but Asset’. IITHyderabad has conducted the virtual orientation for 1st Mtech Batch in E-waste Resource Engg. And Mgmt. ‘Need to move from Chain to Circular Economy’, said Shri Ajay Prakash Sawhney, Secretary, MeitY. Online classes for all courses has been resumed from 1-9-20.

Sep, 2020

IPE Cell at IIT Hyderabad in collaboration with BIRAC organized a webinar on 'Safeguarding the start-ups with an intellectual property strategy' by Dr. Deepa Kachroo Tikku, Partners,K&S Partners on 01-09-2020.

BIRAC WEBINAR SERIES

"Safeguarding the Start-ups with an Intellectual Property Strategy"



Dr Deepa Kachroo Tikku
Partner, K&S Partners

Learn about:

- Strategy for protecting Intellectual Property (IP) by Start-ups
- Need to formulate an IP strategy for the business
- Strategy for acquiring and managing IP
- Common Challenges faced by Start-ups with IP

Session Moderator: Dr. Shirshendu Mukherjee, Mission Director, Grand Challenges India & Head-IP & Technology Management, BIRAC

Vote of Thanks: Dr. Vinita Jindal, Chief Manager-IP & Technology Management, BIRAC

Target Audience: Start-ups, Researchers, Scientists

Registration Link: https://birac.nic.in/ip_strategy_registrationform.php

Registration is free and Mandatory

Contact: biracip.dbt@nic.in

September 1



3:00 pm to 4:30 pm

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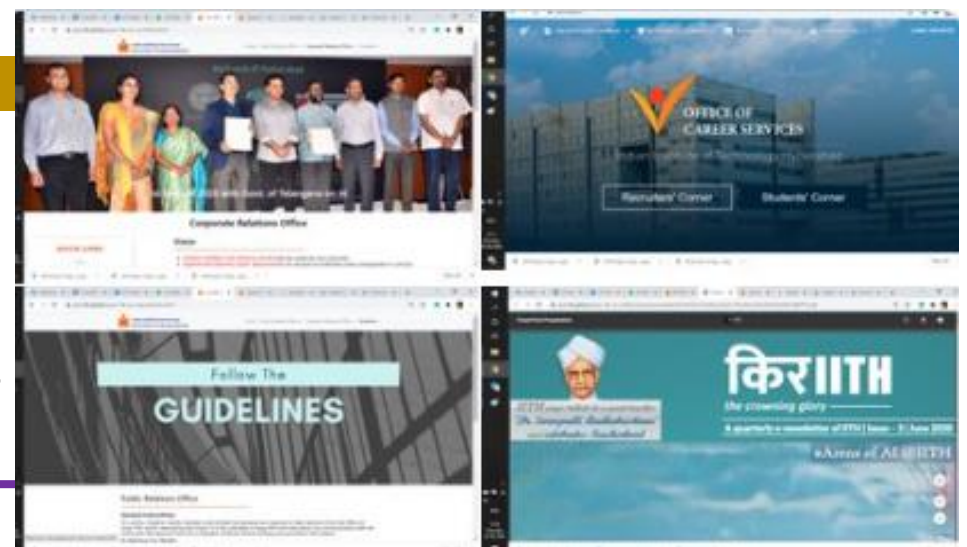


Sep, 2020

Observing Teacher's Day, IIT Hyderabad pleased to Launch PCR Office Website. Take a tour of Website: <https://youtu.be/R1igC2HRrpM> and Visit the Website for more details: <https://pcr.iith.ac.in>

Sep, 2020

IIT Hyderabad has released the किराIITH-The Crowning Glory, Issue-3, #ArenaofAI@IITH. Download your किराIITH Copy: <https://pcr.iith.ac.in/proffice.html#newsletter>. IIT Hyderabad also announced that its Office of Placement will now operate as Office of Career Services. Visit the Website for details: <https://ocs.iith.ac.in>



Sep, 2020



IIT Hyderabad hosted ANOMALIES 2020, an International Online Conference in association with Washington University, Brookhaven National Laboratory and IMSc Chennai.

Sep, 2020

A 5-day Leadership & Excellence Program conducted at IIT Hyderabad from 7th-11th Sept., coordinated by IIT Hyderabad & Art of Living. This program is conducted by Art of Living in collaboration with AICTE (All India Council of Technical Education) at IIT Hyderabad.



Continued...

Sep, 2020



University of Hyderabad and IIT Hyderabad have entered into an MoU on 11th September 2020. The aim of this MoU is to stimulate and facilitate the development of collaborative teaching and mutually beneficial research activities which serve for technical upliftment of both the institutions.

Sep, 2020

Signing off EML talk for the year 2019-2020, Team EML, IITHyderabad organized an 'e-talk' by our very own Chief Coach for the Indian Badminton Team, Padma Bhushan, Shri Pullela Gopichand "The Man Behind Indian Badminton", "The Champ Maker".



Sep, 2020

IIT Raichur in association with WiseUp Communication arranged an interactive web session on the resume, cover letter and interviewing skills which can help the students in interviews and placements.

Sep, 2020

IIT Hyderabad has organized a webinar to sensitize the school teachers, headmasters and other stakeholders in the Unnat Bharat Abhiyan adopted villages on National Education Policy 2020. The session will be in English, Hindi & Telugu language.

Continued...



IIT Hyderabad and Micron India partners to build an ecosystem to further research, education and innovation in memory design

Sep, 2020

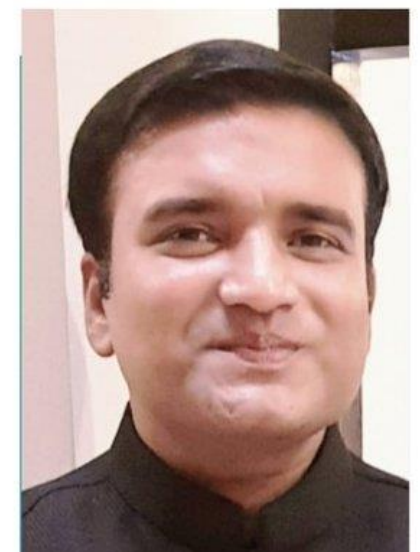
IIT Hyderabad is happy to be a part of Micron India's University Research Alliance (URA) and participate in building an ecosystem to further research, education and innovation in memory design.

Sep, 2020

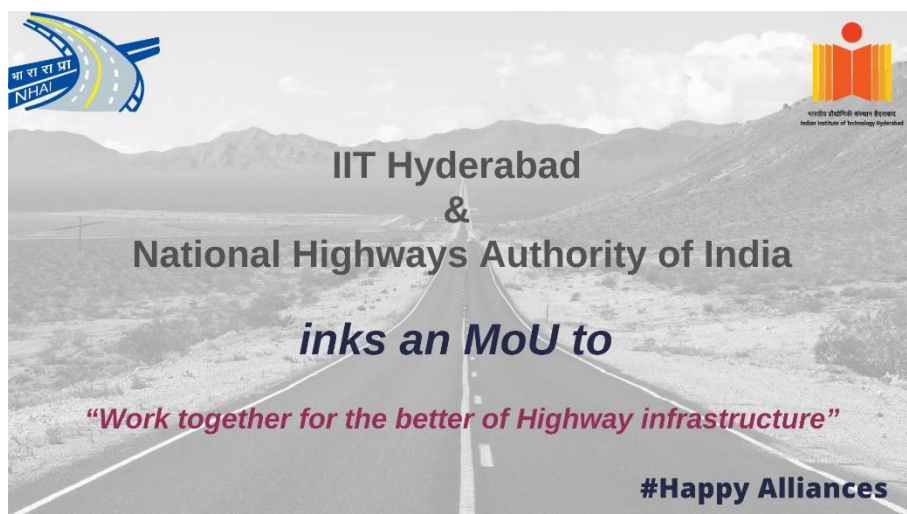
IIT Hyderabad has organized a seminar "Decoding the National Education Policy 2020" by Fr. Vineeth George on Sept 30.



Decoding the National Education Policy 2020



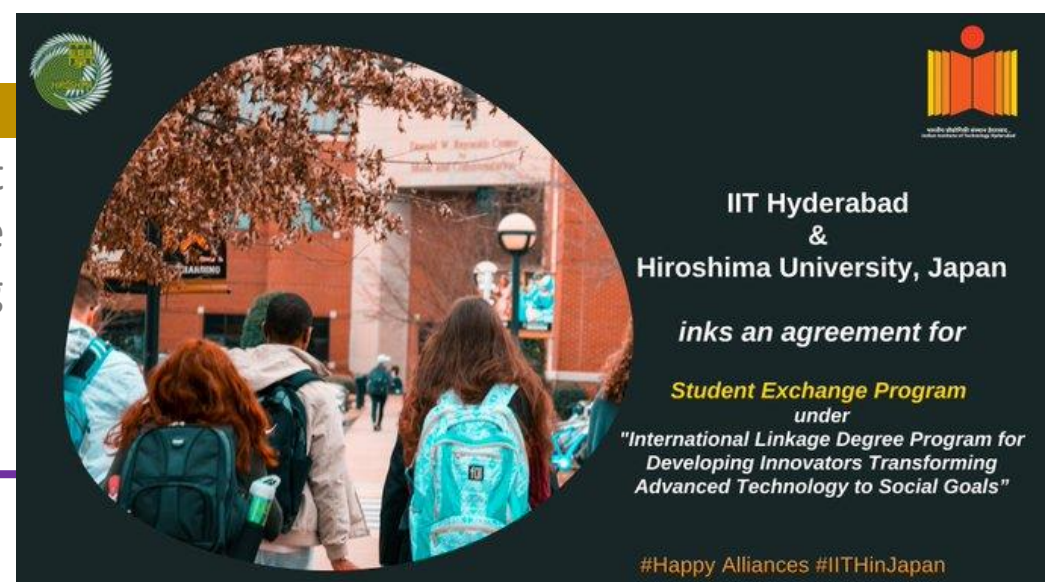
Sep, 2020



IIT Hyderabad & National Highways Authority of India (NHA) ink an MoU to "Work together for the betterment of Highway infrastructure".

Sep, 2020

IIT Hyderabad & Hiroshima University, Japan inks an agreement for Student Exchange Program under "International Linkage Degree Program for Developing Innovators Transforming Advanced Technology to Social Goals".



IIT हैदराबाद में अनुसंधान प्रकोष्ठ स्थापित करेगा डीआरडीओ

■ हैदराबाद (भाषा)।

रक्षा अनुसंधान एवं विकास संगठन (डीआरडीओ) भविष्य में देश की रक्षा संबंधी प्रौद्योगिकी की जरूरतों को पूरा करने के लिए भारतीय प्रौद्योगिकी संस्थान (आईआईटी) हैदराबाद में अनुसंधान प्रकोष्ठ स्थापित करने जा रहा है।

संस्थान की ओर से सोमवार को जारी विज्ञप्ति के मुताबिक डीआरडीओ और आईआईटी हैदराबाद का अनुसंधान प्रकोष्ठ चिह्नित क्षेत्रों में मौलिक एवं व्यावहारिक अनुसंधान कार्यक्रम के लिए कार्य करेगा। दोनों संस्थानों के बीच सहमति पत्र पर हस्ताक्षर करने के लिए डिजिटल कार्यक्रम हैदराबाद स्थित डीआरडीओ के मिसाइल एवं रणनीतिक कार्यक्रम के महानिदेशक के कार्यालय में हुआ और इसमें डीआरडीओ एवं आईआईटी

डीआरडीओ और आईआईटी हैदराबाद का अनुसंधान प्रकोष्ठ चिह्नित क्षेत्रों में मौलिक एवं व्यावहारिक अनुसंधान कार्यक्रम के लिए कार्य करेगा

हैदराबाद के पदाधिकारी शामिल हुए।

विज्ञप्ति के मुताबिक आईआईटी हैदराबाद में स्थापित होने वाला अनुसंधान प्रकोष्ठ चेन्नई स्थित डीआरडीओ के अनुसंधान एवं नवप्रवर्तन केंद्र (आरआईसी) का विस्तार होगा। इस केंद्र की परिकल्पना रक्षा के लिए उन्नत प्रौद्योगिकियों में वैज्ञानिक और अनुप्रयुक्त अनुसंधान करने में उत्कृष्टता केंद्र के रूप में की गई है।

डीआरडीओ-आईआईटी हैदराबाद अनुसंधान प्रकोष्ठ की भावी भूमिका को रेखांकित करते हुए रक्षा अनुसंधान एवं

विकास विभाग के सचिव एवं डीआरडीओ के अध्यक्ष जी सतीश रेड्डी ने कहा कि इस सहमति पत्र का उद्देश्य डीआरडीओ और आईआईटी हैदराबाद की क्षमताओं को एक साथ लाना है ताकि संयुक्त शोध से स्वदेशी प्रौद्योगिकी नई ऊंचाई पर पहुंचाई जा सके। उन्होंने यह बात कार्यक्रम को वीडियो कॉन्फ्रेंस से संबोधित करते हुए कही।

रेड्डी ने कहा कि डीआरडीओ-आईआईटी हैदराबाद अनुसंधान प्रकोष्ठ दोनों संस्थानों के बीच परियोजनाओं का निर्बाध क्रियान्वयन सुनिश्चित करेगा। आईआईटी हैदराबाद के पास आधुनिक प्रौद्योगिकी में अनुसंधान का मजबूत आधार है जिसे देश के विकास के लिए इस प्रकोष्ठ की मदद से मजबूती मिलेगी। आईआईटी हैदराबाद के निदेशक बीएस मूर्ति ने इस पहल के लिए उनके संस्थान को चुनने के लिए डीआरडीओ को धन्यवाद ज्ञापित किया।

DRDO to set up research cell for def tech in IIT-H

Sushil.Rao@timesgroup.com

Hyderabad: DRDO will set up a research cell in IIT-Hyderabad as part of efforts to develop critical defence technology indigenously.

DRDO chairman and secretary, department of defence R&D, G Satheesh Reddy said the DRDO-IITH research cell would play a significant role in ensuring seamless execution of projects.

"This MoU is aimed at bringing together the capabilities of DRDO and IITH in order to achieve greater heights in indigenous technology through collaborative research," he said.

The DRDO-IITH research cell will undertake basic and applied research programmes in identified technology areas and meet the future defence technological requirements.

The MoU was signed by KK Pathak, director, Directorate of Futuristic Technology Management (DFTM), DRDO, MSR Prasad, scientist and director general, missiles and strategic systems (MSS), DRDO, and professor BS Murty, director, IITH. The MoU was signed during a virtual event organised at the DRDO DG-MSS office in the city on July 3 in which officials from DRDO

and IITH took part.

Professor Bhaskar Ramamurthi, director, IIT-Madras, hoped that the proposed research cell would make headway under the umbrella of RIC with strong collaboration between DRDO scientists and IITH researchers.

IIT-H uses machine learning to study biofuel supply chains

Syed.Akbar@timesgroup.com

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Employing computational methods, the researchers devised the method to understand the factors and impediments in incorporating biofuels into the fuel sector in India. This work has been spurred by the increasing need to replace fossil fuels by bio-derived fuels, which, in turn, is driven by the dwindling fossil fuel reserves all over the world, and pollution issues associated with the use of fossil fuels.



IIT-H researchers said their method has shown that in the area of bioethanol integration into mainstream fuel use, the production cost is the highest (43%) followed by import (25%), transport (17%), infrastructure (15%) and inventory (0.43%) costs. The model has also shown that feed availability to the tune of at least 40% of the capacity is needed to meet the projected demands.

The research work was led by Dr Kishalay Mitra, associate professor, department of chemical engineering, IIT-H. Research scholar Kapil Gumte was also part of the team. The result of the research study was

The design and implementation of technological, regulatory & policy approaches and pricing strategy of biofuels depend on an understanding of the supply chains

published in a recent issue of the peer-reviewed, Journal of Cleaner Production. An IIT-H statement said the research paper had won the best paper award during the VI International Conference on Advances in Control and Optimization of Dynamical Systems held at IIT Madras earlier this year.

Dr Mitra said, "In India, biofuels generated from non-food sources is the most promising source of carbon-neutral renewable energy. These second-generation sources include agricultural waste products such as straw, hay and wood, among others, that do not intrude upon food sources."

Continued...

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AI-powered low-cost Covid-19 testing kit



Indian Institute of Technology, Hyderabad, has developed an Artificial-intelligence powered COVID-19 Testing Kit. The kit can generate results for both symptomatic and asymptomatic patients in 20 minutes and is capable of performing at an affordable cost. To ensure the efficiency, the testing kit has already been field-tested at ESIC Medical College and Hospital in Hyderabad.

THE WEEK MAGAZINE

HOME INDIA WORLD BUSINESS SPORTS SCI/TECH LEISURE ENTERTAINMENT

IIT Hyderabad-incubated Pure EV sees 300% rise in sales; plans 2 launches

The company hopes to touch sales of 1,000 units per month by Diwali

By Nachiket Kelkar | July 25, 2020 17:14 IST



A Pure EV electric two-wheeler



HOME NEWS MARKETS COMPANIES ECONOMY INFO-TECH OPINION SPECIALS PORTFOLIO PRESENT MORE Q Search

Science

IIT-H researchers produce carbon electrodes from corn husk

Our Bureau | Hyderabad | Updated on July 29, 2020 | Published on July 29, 2020



istock/ventureventure

Researchers at the Indian Institute of Technology (IIT-Hyderabad) have developed a cost-effective method to produce an 'activated carbon electrode' from corn husk for high-voltage super-capacitors.

IIT Hyd, NVIDIA kickstart AI tech centre

TIMES NEWS NETWORK

Hyderabad: Indian Institute of Technology Hyderabad (IITH) in collaboration with NVIDIA, a multinational technology company, will be establishing India's first 'NVIDIA AI Technology Centre' (NVAITC) to accelerate research on Artificial Intelligence and its commercial adoption.

An event was held on Thursday to mark the commencement of operations of the centre. NVAITC will accelerate research for the 220 faculty at IIT Hyderabad.

"As an IIT with a strong fundamental and technological research focus, IITH is very happy to join this program. This combination of NVIDIA's leading-edge technology for AI Compute and some of the finest minds in the country from IIT Hyderabad will bring synergy to help find solutions to uniquely Indian challenges, be it enhancing crop yield or safer cities. This will build on the strong AI capabilities IIT Hyderabad has built, including the country's first B.Tech in AI program," said BS Murty, director, IITH.

This collaboration between IIT Hyderabad and NVIDIA will focus on advancing AI research in the areas of agriculture and smart cities besides Language Understanding. The projects that would be taken up include increasing crop yield using AI algorithms and applying AI-based solutions to support safer transportation systems and better ways of managing traffic, among others.

"NVIDIA is powering the AI revolution across research facilities everywhere. Our collaboration with IIT Hyderabad will accelerate AI

research and help create innovative solutions to real-world challenges," said Vishal Dhupar, managing director for NVIDIA South Asia.

The state government recently announced 2020 as the 'Year of AI' with an aim to establish Hyderabad among the top 25 global AI innovation hubs. NVIDIA is already a partner to the Telangana government in this endeavor.

IITH already houses two NVIDIA DGX-1 TM systems and an NVIDIA DGX-2TM system dedicated to research being undertaken at the institute.

ROSEVETNAM | AUGUST 2020 | www.theweekmag.com COVER STORY 29

aid to states with a maximum limit of Rs 3000 crore per bulk drug park. Likewise, the government has also sanctioned the establishment of a medical device park in which a maximum grant-in-aid of Rs 100 crore per park will be provided to the states. "An ecosystem is being built for a self-reliant India, which will help in ramping up domestic production in pharmaceutical sector, health and hygiene sector. The government has already announced giving incentives for setting up of bulk drug park and medical device park in India. The government is ready to help the private sector if they want to set up such parks in India by equity participation. Such developments will act as a cog in the wheel of a self-reliant India", says Manoj Mandaviya, Minister of State for Shipping (Independent charge) and Chemicals & Fertilizers, New Delhi.

But the concept of innovation is intertwined with regulation. On one side, complying with regulations is likely to increase costs or restrict the freedom of action in research. While on the other, well designed regulation may guide or even force a country to invest in innovative activities, implement innovative processes or release innovative products. However, in India, the research activities have often felt a certain level of restriction in this aspect.

"India needs to see further improvement in its regulatory policies, especially in the area of patent and price control, to boost growth and present India as a preferred destination for new generation market. Market patented products earn higher margins, which enables companies to plough back resources into R&D and become innovative", shares Rishad Dadachanji, Managing Director, Kalsha Lifesciences, Mumbai.

Establishment of a regulatory platform by the government to facilitate speedy clearances of new products is another development that has been brought about by this urgent need to beat the coronavirus. For instance, the Indian Council of Medical Research (ICMR) has established a fast-track mechanism for validation of non-US FDA, EMA, CE IVD approved diagnostic kits being developed by the industry and the academia.

Another wave of change is being brought about in the form of the new national Science Technology and Innovation Policy (STIP 2020). The office of the Principal Scientific Adviser to the Government of India (Office of PSA) and the Department of Science and Technology (DST) have jointly initiated a decentralized, bottom-up, and inclusive process for the formulation of the fifth Science & Technology policy of India. As the crisis changes the world, the new policy with its decentralized manner of



"The lockdown has given us a realization that this is how the strengths and expertise of a country can be put together at best."
- DR RENU JOHN, Professor, Biomedical Engineering, Indian Institute of Technology (IIT), Hyderabad

formation will reorient innovation in terms of priorities, sectoral focus, the way research is done, and technologies are developed and deployed for larger socio-economic welfare.

On this note, Prof Ashutosh Sharma, Secretary, DST mentions, "The department has undergone tremendous change in recent times evolving into an architect of profound science as against incremental science and the coronavirus crisis is an opportunity to escalate the process. We are now designing programmes such that scientists can take risks in doing their science and produce results that would be impactful and can bring about change. Some of these programmes are the Scientific and Useful Profound Research and Advancement (SUPRA) and Intensification of Research in High Priority Areas (IRHPA). Such programmes are changing the way that science is done. The concept and approach of some of these have been adopted in our efforts to find solutions for the COVID-19 crisis rapidly."

It is quite obvious that the investment in R&D activities carries significant risk because the benefits only emerge over a long period of time and after considerable expense. But without injections of R&D investment, neither incremental nor breakthrough innovations will occur. This change will not happen in a short duration as it will require a lot of experimentation, and some failures too. The period post lockdown requires concerted efforts by all stakeholders working together towards a common goal of creating an innovative ecosystem. The world of academia, industry, and the government needs to converge and collaborate to unlock India's capacity in the life sciences sector.

Dr Manbeena Chawla manbeena.chawla@mactiv.com

Continued...

● NEW IITs

What are they doing differently?

The second-generation IITs are galloping, and in the next few years a few of these may outperform some older IITs.



We don't count the number of publications in which we publish research papers, instead, we focus on quality.

— SARIT K DAS, IIT ROPAR



We made it our mission to work for the society and developing solutions for the Himalayan region.

— TIMOTHY A GONSALVES, IIT MANDI



We can think out-of-the-box, which probably some more established and older institutes may not be able to.

— BS MURTY, IIT HYDERABAD



We aren't in competition with older IITs; instead, institutes such as ours are redefining IITs.

— SUDHIR JAIN, IIT GANDHINAGAR

into modules so that a mechanical engineering student can take computer science or physics classes as well.

It also was the first to start a BTech in Artificial Intelligence; globally, top institutions such as Stanford and MIT offer such a course. "Our AI department has 25 faculty members," Prof Murty says.

Similarly, its BTech in Engineering Science is unique—students can decide after two years which branch of engineering they want to graduate in.

"We have started one full semester of

internship for BTech students, a mechanism that isn't there in any other IIT," he adds. Other unique courses it offers are MTech programmes in additive manufacturing, in medical device innovation, in smart mobility, in cybersecurity and soon.

IIT Hyderabad was recently ranked in the top-10 in India by QS.

Another area where IIT Hyderabad stands out is in the ratio of undergraduate and postgraduate students. "IITs are synonymous with BTech, but we have more PG students than UG—we have about 900

PhD students and 600 in MTech, whereas BTech students are close to 1,200. This year about 100 PhD students are going to get a degree," Prof Murty says.

Global rankings give a lot of emphasis to 'perception'; in QS, for example, 45% goes to perception. Prof Murty says that publishing good research and letting the world know that good work is happening at your institute is the only way to score high on perception. "If you do good work, your perception will get changed for the better," he adds.

IIT Gandhinagar

Director Prof Sudhir Jain says that Gandhinagar isn't in competition with older IITs; the institute, instead, is redefining IITs. Prof Jain, who has taught in Kanpur for 25 years, says that while older IITs may have a rigid decision-making process, newer IITs are nimble. "A younger person has a more flexible body; he can do many things an older person cannot, at the same time learning from the older person. The same is the case with older and newer IITs. We are a white"

DRDO to set up research cell for def tech in IIT-H

Sushil.Rao@timesgroup.com

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Syed.Akbar@timesgroup.com

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The design and implementation of technological, regulatory & policy approaches and pricing strategy of biofuels depend on an understanding of the supply chains

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Continued...

After 4-month hiatus, IIT-H to open Monday

PhD Scholars To Return In Batches Of 70

Preeti.Biswas @timesgroup.com

Hyderabad: After a break of almost four months, the Indian Institute of Technology, Hyderabad (IIT-H) is all set to hold its doors open for students in a phased manner from August 10.

As per the senate decision, PhD research scholars and students pursuing masters of technology (MTech) and masters of design (MDes) will be allowed into the campus in batches of 70.

There are close to 1,500 PhD and masters students enrolled with the IIT-H and the institute has chalked out a detailed plan on reopening of the institution.

To begin with, the institute has already identified PhD scholars, who need to come to the campus for their experimental research. The research scholars identified by the faculty have been asked their choice and only those who choose to come to campus are being allowed to return. "To enable PhD students to carry

CHANGES AMID PANDEMIC



► There are close to 1,500 PhD and masters students enrolled in IIT-H
► The institute has chalked out a detailed plan on reopening of the institution for research scholars and masters students

To enable PhD students to carry out their experimental research, we have decided to invite PhD students to the campus. All precautionary measures will be followed
— Prof BS Murthy | DIRECTOR, IIT-H

out their experimental research amid this pandemic situation, we have decided to invite our PhD students, particularly those in their final year, to the campus. All precautionary measures have been put in place and will be followed to ensure the safety of our students," said Prof BS Murthy, director, IIT-H.

After the PhD students, who need experimental facilities for their theses, MTech/MDes students, whose theses depends on experimental work, will be the next batch to be allowed in the campus. "The first batch is expected to arrive on August 10, 2020. Each batch of students will be self-quarantined for 14 days in one of the hostels before they are allowed to occupy their regu-

lar hostel rooms," reads a statement issued by IIT-H to TOI.

After self-quarantine, students will be allowed to have their meal in the mess by maintaining social distance. After the first batch of students complete their self-quarantine and move to their regular rooms, they will be under observation for a week or two before the next batch of students are allowed into the campus. This process will be continued until the need for social distancing is lifted by the government. "Initial batches of students will be from Telangana and the neighbouring states. Once the national transportation services are improved, PhD students from other states will be invited to return," reads the statement.

Two TS varsities figure in world 'Under 50 years old' rankings

IIT-H and UoH among four institutions from India in QS 2021 Rankings

R. RAVIKANTH REDDY
HYDERABAD

Only four institutions from the country found a place in the QS 2021 World University Rankings in the 'Under 50 years old' institutions category and two among them are from Telangana.

The rankings that were declared on Wednesday cover institutes established less than 50 years ago and still making a mark in the education sector. The top place in the country was bagged by the Indian Institute of Technology Guwahati (IITG) that figured in the 61-70 rankings band while it was at the 47th rank in the QS 2021 World University Rankings irrespective of its age.

The second position in the country went to Indian Institute of Technology Hyderabad (IIT-H) that was placed in the 101-150 rank range. The institute was in the 601-650 band rank in the combined ranking.

The University of Hyderabad (UoH), a central university, was also in the 101-150 band while it was in the 651-700 rank in the combined ranking. The O.P. Jindal Glo-



The second position in the country went to the Indian Institute of Technology, Hyderabad, which was placed in the 101-150 rank range. •FILE PHOTO

bal University also secured a place in the same band in the Under 50 category as well as the combined rankings. It is the only private institute to have got into the rankings.

Classified as a medium-sized public institution with high research intensity, the University of Hyderabad is the only multidisciplinary public university among the four institutions from India to figure in the list.

Academic reputation, employer reputation, citations per faculty, faculty-student ratio, international faculty and international students

are the parameters on which the university has been ranked by QS.

Vice-Chancellor of UoH Appa Rao Podile said that the rankings has for the second consecutive year placed the varsity among the top 101-150 band. He said the varsity has been recognised among the fastest growing Under-50 institutions in the world consecutively for the last three years. "We attribute this to the excellent work of faculty, staff, students and our alumni," he said.

Nanyang Technological

University, Singapore, bagged the top spot in the QS Top 50 Under 50, a table exclusively for the world's younger academic institutions.

Pak varsities fare better
Much to the surprise of Indian academics, three universities from Pakistan were placed at much better positions in the same rankings. The National University of Sciences and Technology (NUST) Islamabad secured 41st rank in the Under 50 category while it was at 355th rank in the combined ranking.

Similarly, Pakistan Institute of Engineering and Applied Sciences (PIEAS) was at the 46th rank while it secured 373th rank in the combined list. The Lahore University of Management Sciences (LUMS) was in the 101-150 band in the 'Under 50' category.

QS World University Rankings is published annually by the British company Quacquarelli Symonds (QS). In the 2021 edition of the Rankings, 1,604 institutions from 93 locations were covered.

IIT-H researchers develop tool to detect use of mobile phones

HANS NEWS SERVICE

Hyderabad: Indian Institute of Technology, Hyderabad (IIT-H) researchers developed a tool to monitor and automatically detect usage of mobile phones that are active.

An IIT-H statement on Thursday said that the researchers at the institute have developed the new technique using artificial intelligence (AI) based algorithms to detect mobile phone usage.

Dr Sparsh Mittal who led the research along with his team of scholars Poonam Rajput and Subhrajit Nag of the Computer Sciences Engineering department said that the results of the work have been accepted in the peer-reviewed conference "International Conference on Smart Objects and Technologies for Social Good 2020," held at Belgium 2020.

Giving details and the importance of the research, Dr Sparsh Mittal said that mobile phones have deeply penetrated people's lives. Mobile-phone addiction has become a great concern for many parents, lawmakers and the authorities at educational institutes and offices. It is impossible to manually



detect the mobile-phone at large-scale.

Hence, there is a need to develop automated techniques for this purpose. "We believe that our technique has immense potential. It can help improve productivity by preventing excess or untimely usage of the mobile phone. It can help in avoiding accidents due to distraction during driving."

Also, mobile phones are prohibited in many places such as petrol pumps, exam-halls, embassies, military bases, and courts of law. Our

technique can be used to find whether the mobile phone is being used in such areas. Finally, many financial transactions now happen on mobile phones and the loss of mobile phones can have severe consequences. By allowing tracking of mobile phone, "our technique can help in detecting loss or theft of the mobile phone," he added.

Poonam Rajput, research scholar at IIT-H said that mobile phone is a relatively small object when seen in photos or videos using surveillance or CCTV cameras.

As a result, many existing object detection algorithms fail to detect it properly. Further, mobile phones come in different sizes and shapes, such as feature phones and smartphones. These factors make the detection a challenge. "We have used algorithms based on deep-learning to detect mobile-phone usage. Our fastest algorithm runs at nearly 27 frames-per-second on a high-end GPU, which means it can process a video in real-time, she informed.

It is also known that the algorithms have achieved nearly 99 per cent accuracy on the Kaggle Driver dataset and 96 per cent accuracy on the IIT-H-DMU dataset. It is the first to detect mobile phones' usage in both indoor and outdoor environments with a lot of clutter and other background objects, he said.

Sharing his insights on the dataset collection Subhrajit Nag said, "A crucial challenge we faced was that deep-learning algorithms require a massive amount of training data to make robust predictions." However, the research team has come over the challenges posed with the help of the datasets of IIT-H-DMU and Kaggle Driver, he added.

Indo-UK team conducts research on presence of antibiotic-resistant bacteria in Musi river

Researchers say an estimated 58,000 babies die in India every year from superbug infections passed on from their mothers

- ▶ India-Uk to research on antibiotic resistant bacteria in Musi river and Adyar river in Tamil Nadu
- ▶ The project is jointly funded by India-UK government

GUDUPALLI SRINIVAS

Ranga Reddy: A new research on release of antibiotics into India's rivers by industries and its impact on the spread of potentially fatal drug-resistant infections to be conducted by IIT-H and University of Birmingham.

The project is jointly funded by India-UK government with aim to research on deepening existing scientific research collaboration with five new programmes to tackle anti-microbial resistance, supported by the UK's Natural Environment Research Council and India's Department of Bio-



Technology. Researchers said, an estimated 58,000 babies die in India every year from superbug infections passed on from their mothers.

Experts from the team will sample the research on the two contrasting river networks, The Musi River which has high concentrations of antibiotics released from industries and less polluted

Adyar river in Tamil Nadu, team aims to learn how far resistant bacteria travel before they die or are eaten by other organisms in a unique combination of experiments.

Indian project lead Shashidhar Thatikonda of IIT Hyderabad said, We found from previous research that the River Musi is now a factory of superbugs. Modelling

water flows will be crucial in predicting the fate of resistant bacteria in the environment and we aim to create models that will be applicable in other rivers and countries.

He also said that the recommendations we will produce will help bring down the levels of resistance in the environment. This will contribute to reduce the abundance of resistant pathogens that make infections untreatable.

Jan Kreft from the University of Birmingham said, We do not know how quickly antibiotics are degraded in the environment and how much they are diluted by rainfall and by entering larger rivers, we will learn how antibiotics from manufacturing and the resistant bacteria they select will flow through river networks and how far they can be transported in rivers.

Industrial areas must have a buffer zone, say experts

Uttara.Varma@timesgroup.com

Hyderabad: The densely populated industrial areas are leaving residents vulnerable to pollutants. As a major part of the city was engulfed in smog and a chemical-like smell for the last few days, urban planning experts urged a rethink on the location of industries.

"Areas which were earlier deserted around industrial areas including Miyapur, Nancharam are now residential hubs. In the 70s, paddy was still being grown here, but with the hectic development,

HEALTH IMPLICATIONS OF POLLUTION

▶ The health implications of pollution are often not something that are apparent immediately, said experts



the density of the city has undergone a massive change," said Dabu Rao, former scientist of the Indian Institute of

Not everyone who develops a headache or stinging eyes would seek medical attention. This makes it difficult to trace whether the cause of these issues are pollution or otherwise

— Aalok Khandekar,
DEPARTMENT OF LIBERAL ARTS, IITH

Chemical Technology (IICT). Rao said there is a need for caution as typically industrial areas must have a buffer zo-

ne to protect the layperson who may not be aware of the impact of emissions and possible leaks from industries – particularly chemical industries located in the city and its surroundings.

Experts agree that a buffer, from anywhere between 50 meters for a mechanical, industrial unit to as much as 3 km for a chemical unit, should be created. In the Vizag gas leak in May, the vapour cloud spread to an area covering 3 km. "We do not even know what the health impacts of the release of some chemicals can be on human health. The

pharma sector maybe using combinations of chemicals whose impact on human health is unknown," said Rao.

Population density figures sourced from data European Joint Research Centre (EU JRC) of the European Commission and mapped by Pradeep Goud Macharla, show several industrial belts with high population density areas near them such as Jeedimetla, Patancheru and Bollaram. EU JRC sources information from the census among other data points.

Raising the issue, Srikanth Peddibhotla, founder of

the urban planning platform HappiCities, asked: "Why are polluting industries within ORR forced to relocate outside ORR? Businesses need stable and sensible land use planning to grow. Years of hard work put in to establish industry is disrupted by forcing relocation due to failure of urban planning enforcement." He said as a society we value lands more than life.

"There is no sensible reason for the land near heavy industrial zones to attract investments for residential layouts and plots and increase in land prices," he said.

Continued...

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IIT Hyderabad-incubated startup Pure EV launches e-scooter in Nepal

By Autocar Pro News Desk, 15 Sep 2020

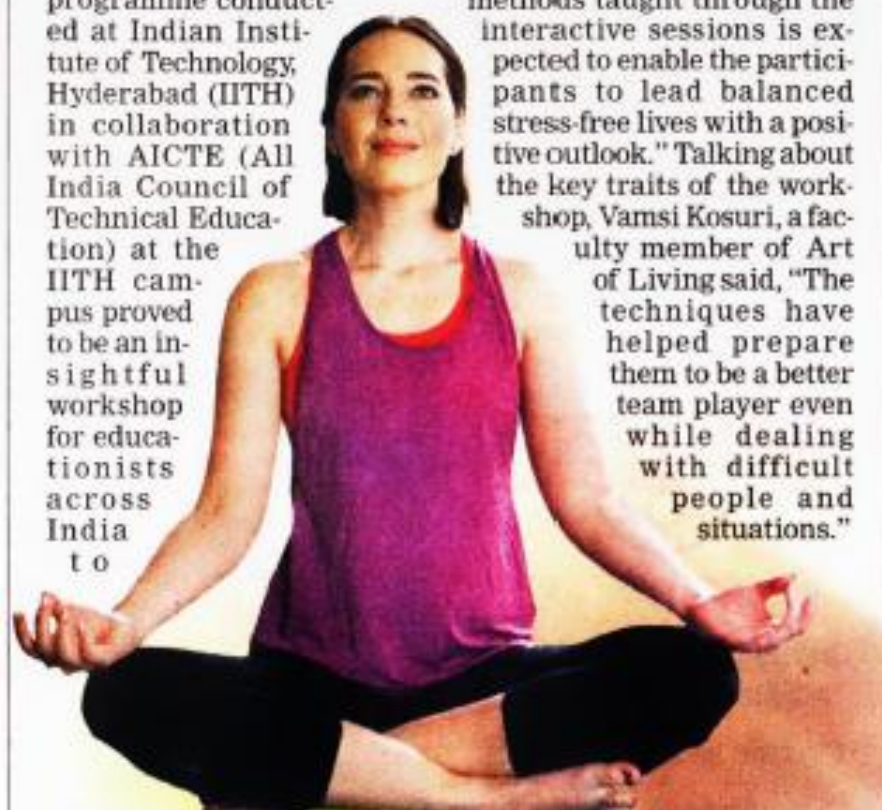


IIT Hyderabad-incubated electric mobility startup Pure EV has entered its first international market, Nepal. The startup says it will launch its premium model 'EPluto7G' in Nepal by October 2020 as part of its international expansion plans.

IITH's mind matters

EXPRESS FEATURES

OTHER than offering help in battling daily-stress, meditation helps the thoughts to organise in such a way that those practising the methods are able to decide better, think clearly, and respond better. And in these tough times, the responsibility of faculty members of an organisation increases adding to the workload. A good meditation programme can offer much help then. That's how a five-day leadership and excellence programme conducted at Indian Institute of Technology, Hyderabad (IITH) in collaboration with AICTE (All India Council of Technical Education) at the IITH campus proved to be an insightful workshop for educationists across India



help them perform under high complexity and drive with better collaboration and innovation. Among the participants were eminent educationists from the regulatory bodies and institutions.

The benefits include well-being, leadership agility, performance, change management, team building and effective decision making. Speaking about the benefits of the programme, Prof Melapurath Deepa, Dean (Faculty), IIT Hyderabad said, "The sustained practice of the methods taught through the interactive sessions is expected to enable the participants to lead balanced stress-free lives with a positive outlook." Talking about the key traits of the workshop, Vamsi Kosuri, a faculty member of Art of Living said, "The techniques have helped prepare them to be a better team player even while dealing with difficult people and situations."

'Become exporter of Defence tech'

Sateesh Reddy addresses IITH Foundation Day celebrations held virtually

R. AVADHANI
SANGAREDDY

Defence Secretary and Chairman of the Deference Research Development Organisation (DRDO) G. Sateesh Reddy said India needed to develop home-grown technologies, that is, Atma Nirbhar Bharat, and should grow from being an importer of Defence technologies to an exporter in the next 10 years.

He stressed the importance of focusing on bio-medical engineering, stating that in top universities around the world both engineering and medical streams



The IITH buildings.
• MOHD ARIF

worked together to bring excellent health products.

Participated in the 12th Foundation Day celebrations of the Indian Institute of Technology, Hyderabad, held virtually here on Sunday, Dr. Sateesh Reddy said doctors and engineers

should join hands to make strides in bio-medical engineering.

'An opportunity'

He said the COVID-19 pandemic gave the country an opportunity to prove itself. India, which had produced 37,000 personal protection equipment (PPE) kits a year, was now producing six lakh PPE kits a day.

Stressing the need for working together by academia, research and development institutes and industry, Dr. Sateesh Reddy said: "So far we are followers of technologies. We must become

leaders of technologies."

Appreciating the innovations of the Centre for Healthcare Entrepreneurship (CHE) of IITH, Dr. D. Nageswar Reddy Chief of Gastroenterology and Therapeutic Endoscopy, Asian Institute of Gastroenterology, said medical experts should update themselves on developments in metallurgy and other areas.

IT Secretary Jayesh Ranjan said IITH could implement the new education policy which encouraged students to learn from different streams. IITH Director Murty was present.



Jul 2020

Dr. Praveen Tammana: Assistant Professor, Department of Computer Science and Engineering

Prior to joining IITH, he was a Post-Doctoral Researcher in Computer Science at Princeton University, Princeton, NJ. Before Princeton, he received his Ph.D. from The University of Edinburgh, UK, and his Master's degree from IIT-Madras, India. He has over three years of industrial experience working with Intel technology and Juniper Networks, at Bangalore, and Cisco Systems, San Jose, USA. His research interests are in Systems and Networking. He develops scalable, fast, and easy-to-use real-world systems addressing problems in the area of Computer Networks.

Life@IITH: I very much liked the research and teaching ecosystem built in such a short period. The research culture is underpinned by integrity, support, clear policies, and best practices. I'm glad to be part of the IITH community.



Jul 2020

Dr. Vikrant: Assistant Professor, Department of Chemical Engineering

He did his PhD from Eindhoven University of Technology, The Netherlands in the year 2014. He was an independent researcher at National Energy Technology Laboratory, DOE, USA (2014-2016). Before joining IITH he was postdoc research associate at Delft University of Technology, The Netherlands. He did his Dual Degree in Chemical Engineering from IIT Delhi. His research is focused on multiscale modeling of multiphase flows.

Life@IITH: Despite this challenging time of COVID, IITH made its best arrangements to join the institute smoothly and helped me to settle down safely. Things are online from teaching to meeting; I can still feel connected to the institute and to my colleagues. All our basic needs are available in the campus, without stepping out of the campus (due to COVID/lockdown) we are having a smooth journey. I am looking forward to exploring the opportunities at IITH.



Jul 2020

Dr. Anupam Gupta: Assistant Professor, Department of Physics

Prior to joining IITH, he was a Post-Doctoral Researcher in Applied Maths at Paulson Schools of Engineering and Applied Science, at Harvard University, Cambridge, MA. Before working at Harvard University, he was a Post-Doctoral research associate at the University of Illinois at Urbana-Champaign. Prior to that, he was an ERC Post-Doctoral fellow at the University of Rome, Italy. He received his Ph.D. from the Indian Institute of Science, Bangalore, India, and his Master's degree from Jawaharlal Nehru University, NewDelhi, India. His research interests are in soft-matter, biophysics, complex systems and fluid turbulence. He develops numerical methods to simulate and understand the physics of complex flows. In the recent past, he has spent time on developing models for bio-physical and complex systems.

Life@IITH: After coming to IIT Hyderabad, I have built my own group with a focus on the physics of the living systems. The environment at IITH is very positive, I have also initiated an interdisciplinary bi-monthly seminar series Applied Physics and Machine Learning (APML), which takes place every other Tuesday. This semester I taught Classical Physics to the second-year undergraduate students and Classical Mechanics to Physics PhD students.



Jul 2020

Dr. Saurabh Sandilya: Assistant Professor, Department of Physics

He studies the fundamental building blocks of nature, and is keen to understand the matter and the interactions they experience at the deepest level. Prior to joining IITH, he was working as a Post-Doctoral Researcher in the Department of Physics, University of Cincinnati. He was mostly based at the High Energy Accelerator Research Organization (KEK), Japan for the development and commissioning of the Time of Propagation detector for the Belle II experiment. He also analyses physics data from the electron positron collisions recorded by the Belle II experiment at the SuperKEKB accelerator and its predecessor Belle experiment at the KEKB accelerator. Apart from his research interests for the development of High Energy Physics detectors to identify and measure sub-atomic particles, he is currently looking for new physics in the rare decays of B-mesons (meson with a heavy 'b' quark) by precisely measuring them.

Life@IITH: Blessed to be part of a family like members at IITH. Pleasure to see the beautiful campus growing day by day. I am excited for the bright future for IITH and feel privileged to be part of it.



Jul 2020

Dr. Shashank Vatedka: Assistant Professor, Department of Electrical Engineering

He received his MSc (Engg) and PhD in Electrical Communication Engineering from the Indian Institute of Science (IISc) Bangalore in 2017. During 2016-17, he was a research associate and during 2017-18, a postdoctoral fellow both at the Institute of Network Coding, the Chinese University of Hong Kong. During 2018-19, he was with Telecom Paris, France as a postdoc before joining the Dept of EE, IIT Hyderabad as an assistant professor. His professional recognitions include a TCS research fellowship during his PhD, the Seshagiri Kaikini medal for best PhD thesis in ECE from IISc, and an honorable mention for the best paper award in SPCOM 2020. His research interests are in information theory, error correcting codes and security.

Life@IITH: My experience at IIT Hyderabad has been wonderful so far. My colleagues have been very kind and helped me in settling down very quickly, and I've been fortunate to teach and interact with some fantastic students.

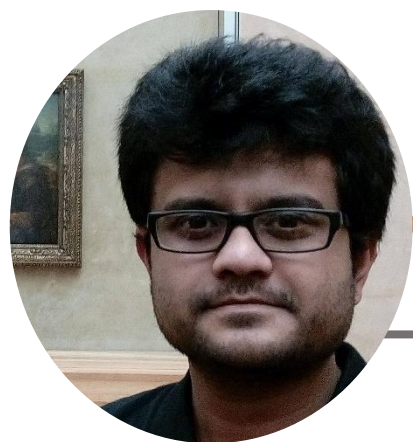


Jul 2020

Dr. Kirit Makwana: Assistant Professor, Department of Physics

His research interests are in the fields of basic plasma physics, space plasmas, plasma astrophysics, and high-performance computing. He uses and develops computational and theoretical tools that connect the macro-scale physics of a plasma to its micro-physics. Prior to joining IITH, he was a Post-Doctoral Researcher at Deutsches Elektronen-Synchrotron (DESY), Zeuthen, Germany. Before that, he was a Post-Doctoral Fellow at the Centre for mathematical Plasma-Astrophysics (CmPA) at KU Leuven University in Belgium. Prior to that he was a Post-Doctoral Scholar in the Department of Astronomy & Astrophysics at University of Chicago, USA. He received his Ph.D. from the University of Wisconsin-Madison, USA, and his Bachelor's degree from IIT Bombay, India.

Life@IITH: My joining process was smooth and both teaching and research work started without any problems. The campus and facilities at IITH are world-class. I find the go-getting attitude of the IITH family truly remarkable.



Jul 2020

Dr. Mrinmoy Datta: Assistant Professor, Department of Mathematics

Prior to joining IIT Hyderabad, He held a postdoctoral position with Institute of Mathematics and Statistics, UiT, The Arctic University of Norway for a duration of two years (2018-2020) and he was employed with the Technical University of Denmark for two years (2016-2018). He obtained his PhD in the year 2016 from IIT Bombay. He is interested in Algebraic Geometry and their applications to Error-correcting codes.

Life@IITH: Ever since we emerged from our quarantine (due to COVID-19), my wife and I have enjoyed our stay on the IITH campus. All the colleagues at IIT Hyderabad have helped me out in innumerable ways. More importantly, at a personal level, we are lucky to have befriended several like-minded families who are always around for sharing a cup of coffee and relaxing discussions at the end of a tiring day at work.



Jul 2020

Dr. Lakshmana Chandrala: Assistant Professor, Department of Mechanical and Aerospace Engineering

He obtained his Ph.D. and M.Tech in Aerospace engineering from IIT Kanpur. Prior to joining IIT Hyderabad, he held a postdoctoral position with the Department of Mechanical engineering at Johns Hopkins University for about 3.5 years. During his stay at Johns Hopkins, he worked on the effect of aerosols on the human respiratory system, and oil spills. His current research interests include experimental fluid dynamics, development of optical-based flow diagnostic techniques, multi-phase flows, marine aerosols, and the impact of aerosols on the human bronchial epithelial cells.

Life@IITH: My experience at IITH was wonderful. Unlike older IITs, there is no hierarchy among the faculty at IITH, in particular the MAE department. Amazed by the support I receive from senior faculty and other people in the administration. I joined IITH during the peak period of COVID. So far, my transition has been effortless, because of assistance from the IITH administration, especially the DEAN faculty office.



Aug 2020

Dr. Maria Francis: Assistant Professor, Department of Computer Science and Engineering

After graduating from NIT Calicut in 2007, She worked for two years with Microsoft at their Hyderabad office and then joined IISc Bangalore for her doctoral studies. After submitting her thesis, she moved to Johannes Kepler University in Austria as a postdoc. Her research focuses on developing algorithmic tools for algebraic problems and how to apply these tools in cryptography.

Life@IITH: I am having a wonderful time at the CSE department, IITH thanks to my extremely helpful and committed colleagues and students.



Aug 2020

Ms. Seema Krishnakumar: Assistant Professor, Department of Design

She has a B Tech in Civil engineering (Cochin University of Science and Technology) and MS in Communication Design (Pratt Institute, New York). She is currently pursuing PhD at Industrial Design Centre, IIT Bombay. Her earlier work experiences include working with National Institute of Design, Ahmedabad and DJ Academy of Design, Coimbatore. She was also instrumental in starting Kerala State Institute of Design and served as its Director for sometime. She was a recipient of Fulbright – Nehru fellowship to pursue her Masters in the US.

Life@IITH: Every new place comes with its own challenges and IITH has been no different. For me academically, it allowed me to think more interdisciplinary than Design alone. It has opened a lot of new avenues and room to network. Looking forward to many more years of fruitful collaborations.



Aug 2020

Dr. Pritha Chatterjee: Assistant Professor, Department of Civil Engineering

I graduated with a bachelor's degree in Civil Engineering from Bengal Engineering and Science University, Shibpur in the year 2010, followed by an MTech in Environmental Engineering from Indian Institute of Technology Kharagpur in the year 2013. I have a PhD in Civil Engineering from IIT Kharagpur with a specialization in Environmental Engineering. After completing my doctoral studies in 2017, I worked as a post-doctoral researcher at Tampere University, Finland for a year and a half. In 2019, I became an Associate Editor of the ASCE Journal of Toxic, Hazardous and Radioactive Waste.

Life@IITH: My richest experience here at IIT Hyderabad has been with my students. I have come across quite a few curious and brilliant young minds. Teaching has always been a passion, and students here have encouraged me to keep pushing my boundaries. Apart from teaching and research, I also enjoy being a hostel warden. I must say that I am lucky to have come across wonderful colleagues with whom my relationship has been beyond formal and who have made my stay at IITH cherishable. I hope to continue this journey with the same, if not more, enthusiasm and passion than I had when I joined this prestigious Institute.



Aug 2020

Dr. Rogers Mathew: Associate Professor, Department of Computer Science and Engineering

Prior to joining IITH in 2019 as Assistant Professor, Dr. Rogers was an Assistant Professor in IIT Kharagpur from 2015. Before working at IIT Kharagpur, he was a postdoctoral fellow at CRI, University of Haifa, Israel and at Dept. of Math & Stat., Dalhousie University, Canada. Rogers did his B.Tech. from College of Engineering, Trivandrum and obtained his M.E. and PhD degrees from IISc Bangalore. His research interests are in the fields of combinatorics, graph theory, and graph algorithms.

Life@IITH: With wonderful colleagues and a nice work environment, my life at IITH has been great so far.



Aug 2020

Dr. Anindya Roy: Professor, Department of Biotechnology

Prior to joining IIT Hyderabad in 2010, Dr Roy pursued his post-doctoral studies at the Clare Hall Laboratories, UK, during 2005-10. Dr. Roy obtained his Ph.D. degree from the Indian Institute of Science in 2005. His specialization is in Molecular Biology and Biochemistry and his current research area is DNA repair.

Life@IITH: I have seen IIT Hyderabad growing almost from the beginning and the Institute also allowed me to grow as a scientist. From my experience, I can tell that the research independence that I enjoy at IIT Hyderabad is unparalleled. As we moved from our temporary campus to the new campus with construction all around us in full swing, I can't wait to see our new campus in its full glory. With the new responsibility as Head of the Biotechnology Department, I am looking forward to exciting research and teaching at our Department in IITH.



Aug 2020

Dr. Bheemarjuna Reddy Tamma: Professor, Department of Computer Science and Engineering

He obtained his Ph.D. degree from IIT Madras in 2007 and then worked as a post-doctoral fellow at the University of California San Diego (UCSD) division of California Institute for Telecommunications and Information Technology (CALIT2) prior to taking up faculty position at IIT Hyderabad, India in 2010. His research interests are in the areas of Converged Cloud Radio Access Networks, SDN/NFV for 5G, V2X, Network Security, and Green ICT.

Life@IITH: I am privileged to have been associated with IITH in its formative years. Being a new institute, it offered me several unique collaboration opportunities on the research front and presented various administrative responsibilities like HoD of CSE Dept and Chair of Computer Center early in my career. Even though I have completed 10 years of my service in the institute recently, I do not remember how all these years have passed. For this the credit goes to the steady stream of young and bright students, and friendly colleagues in the CSE/IITH family. The growth of the institute is phenomenal in various fronts like student strength, faculty strength, R&D infrastructure, and NIRF ranking against all odds thanks to visionary leadership from the top, and dedication and hard work of faculty and staff members. By 2022, IITH will boast of a full-fledged world-class campus at the center of India.



Aug 2020

Dr. Suhash Ranjan Dey: Professor, Department of Materials Science and Metallurgical Engineering

Before joining at IIT Hyderabad in 2010, he pursued his research career as Post-Doctoral fellow in Risø National Laboratory, Denmark for one year, followed by as Alexander von Humboldt Research Fellow in Technical University Dresden, Germany for little more than 2 years and as Research Scientist in Ruhr-University Bochum, Germany for little more than one year. Dr Suhash Ranjan Dey received his B.Sc. in Chemistry (Hons.) in 1998 from University of Delhi, India. He obtained his M.Sc. in Chemistry in 2000 and M.Tech. in Materials and Metallurgical Engineering in 2002 from Indian Institute of Technology Kanpur and his Ph.D. in Materials Science in 2006 from Université Paul Verlaine – Metz, France. His current research focuses is on combinatorial alloy design of emerging materials with varied morphologies for energy conversion, sensors, and biomedical applications.

Continued...

Life@IITH: It took exactly 10 years to become a Professor in the department of Materials Science and Metallurgical Engineering in the sprawling Kandi Campus. I joined the same department as Assistant Professor on 1st September 2010 in the Yeddumailaram Campus. In these 10 years, I see a change every day at IIT Hyderabad and all these are for the better; towards a better campus, a better institute and a better academic lifestyle. Invention and Innovation of Technology for Humans is another metaphor of IITH and I get the same thrill of living it everyday.



Aug 2020

Dr. Bharat Bhooshan Panigrahi: Professor, Department of Materials Science and Metallurgical Engineering

Prior to joining IIT Hyderabad in 2011, he worked at the University of Aveiro, Portugal, Korea Research Institute of Standard and Science (KRISS), Daejeon and Korea University, Seoul, South Korea. Dr. Panigrahi obtained his PhD from IIT Kharagpur in 2004.

His specialization is in Structural Materials, Powder Metallurgy and Sintering Theory. His current research areas are on High Entropy Alloys, Steels and Advanced Composites.

Life@IITH: It has been about 9 years of mixed experience since I joined this newly established IITH family. Being a newer institution, it provided a perfect platform and atmosphere to groom its young faculty on all fronts. Developing one of its kind, a fractal system based B.Tech. the curriculum of Materials Science and Metallurgical Engineering was one of my most exciting experience. Having an emphasis on research, I had a chance to set up teaching laboratories and several sophisticated research facilities in the department, which gives me immense satisfaction, when I look back. Having just fewer research students, in the beginning, working with them was a different experience, like fellow scholar and supervisor. Seeing my first PhD student receiving his degree was one of my happiest moment. Laying the foundation stone of MSME department building as a HOD is one of my memorable moment. I feel privileged, to have served at several smaller and bigger administrative responsibilities, which were full of challenges, being not having prior experiences. Some of my tasks were to be done first time for this institute, starting from fractal academic program booklet publication, organizing its first Convocation at the IITH at ODF campus, coordinating and formulating guidelines for TEQIP programs with then MHRD, coordinating new national-level fellowship program - PMRF (Nodal Institute for MSME discipline), and setting up of a new institution of IIT Bhilai. Last but not least, the organizing JEE Advanced 2020 as a Chairman, amid Covid-19 pandemic was a challenge of a different level. I look forward to having exciting research and academic career ahead. I take this opportunity to thank one and all for their supports, guidance and trust.



Sep 2020

Dr. Pradeep Yemula: Associate Professor, Department of Electrical Engineering

He joined IITH as Assistant Professor in Jan 2014. Prior to joining IITH he worked as Assistant Research Professor at the School of Electrical and Electronics Engineering at Washington State University, WA, Pullman, USA. He has a Masters Degree (2006) and a PhD (2012) from Indian Institute of Technology Bombay (IITB). His research areas include information architectures for power control centers, Common Information Models, Smart Cities, Interoperability, Demand Response, and Standards for Smart Grids. He also serves as faculty-in-charge of placements at IITH. He is a member of Power system control and associated communications (LITD 10) committee under Bureau of Indian Standards (BIS). Apart from these activities he is passionate about teaching and enjoys delivering lectures to young engineers on core power system concepts and advanced smart grids concepts. His lectures are available for free on youtube, under the channel named "Pradeep Yemula". His team is instrumental in the ongoing development of campus energy monitoring system. See: CEMS.iith.ac.in

Life@IITH: IIT Hyderabad provides academic freedom and an excellent environment to its faculty in building their research work. The radical approach in challenging the traditional conventions in teaching and research has propelled IITH to be on par with established IITs. In addition to R&D work, I have particularly enjoyed learning a great deal while heading the placement office at IITH.



Sep 2020

Dr. Bhuvanesh Ramakrishna: Associate Professor, Department of Physics

Prior to joining IITH in 2015, Bhuvanesh was a Ramanujan fellow at the Raja Ramanna Centre for Advanced Technology, Indore. He worked for two postdoctoral positions at University College Dublin and Helmholtz Zentrum, Germany. Bhuvanesh did his MSc from Osmania University, Hyderabad and obtained Ph.D. degree in 2010 from The Queens University of Belfast, UK. His research interests are in the fields of Laser plasma, Table top accelerators, Laser Fusion.

Life@IITH: I work in one of the most dynamic and vibrant IITs in India. The average age of faculty is around 38 and although IITH is only a decade old we have a lot of collaboration within and outside the Departments. All Faculty are very friendly it gives me an immense pleasure to work with students and faculty.



Sep 2020

Dr. B. Umashankar: Professor, Department of Civil Engineering

He has been with IIT Hyderabad since 2009 after completing his PhD from Purdue University. He did his Bachelors from S V University in 2000 and Masters from IIT Kanpur in 2002. He specializes in geotechnical engineering with a research focus on geosynthetics in Pavements, reinforced earth structures, foundation engineering, recyclable materials in geotechnics, and soil-structure interaction. He has been involved with several research projects funded by National Highway Authority of India (NHAI), Ministry of Road Transport & Highways (MoRTH), Neyveli Lignite Co. Ltd. (NLC), Department of Science and Technology (DST), etc.

Continued...

He is a technical advisor to the Irrigation & CAD Department, Government of Telangana, in the design and construction of barrages and pump houses for the prestigious and gigantic project recently undertaken in the State- 'The Kaleshwaram Lift Irrigation Project'. He is also an empanelled expert to render technical advice of ash dyke works of National Thermal Power Co. Ltd. (NTPC) for 2019-2022.

Life@IITH: Being one of the 1st batch of faculty to have joined the Institute and the 1st one in the Department of Civil Engineering, I had an opportunity to witness myself, my Department and my Institute grow over the last 12 years. IITH provided the freedom to explore, interact and innovate in teaching and research without set boundaries and rules, this I believe is the hallmark of IITH.



Sep 2020

Dr. Amirtham Rajagopal: Professor, Department of Civil Engineering

Prior to joining IITH in 2010, Dr. Rajagopal was a postdoctoral fellow at Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany for about 3 years. Earlier to this he was an institute post-doctoral fellow for about a year at IIT Madras. Dr. Rajagopal obtained his Ph.D. degree from the Indian Institute of Technology Madras in the year 2007. He has obtained his B.Tech in Civil Engineering from Bangalore University in the year 1997 and M. Tech in Structural Engineering from VTU in the year 2000 His specialization is in Structural Engineering and Mechanics. His current research interests are in the fields of Fracture and Damage Mechanics, Multiscale modelling, Nonlinear Finite Element and Mesh Free Methods.

Life@IITH: It has been little over a decade since my joining IIT Hyderabad as an assistant professor in 2010. It has been a fantastic first-mile journey this far at IIT Hyderabad for pursuing my passion in an academic career. I feel honored to be part of the IITH family. The academic environment at IIT Hyderabad is simply vibrant and excellent. Over the years, the research infrastructure at IIT Hyderabad has become world-class. It is time only to thank for all the continuous support from IIT Hyderabad. I look forward to contributing more to this excellence in research, teaching and the growth of the institute.



Sep 2020

Dr. T. Shashidhar: Professor, Department of of Civil Engineering

He obtained his PhD from IIT Madras in 2006. Prior to joining at IIT Hyderabad in 2011, He worked as faculty at AIT Bangkok and NITW. He received Young Engineer award from Institute of Engineers, India, and UBA award from MHRD for implementing Swatchh Bharat Abhiyan in villages. For the past several years, he is serving as a member of the Telangana State Pollution Control Board and National Green Tribunal committees. He was extensively involved in the hydraulic designs of Kaleshwaram Project, which is the world's largest multi-stage lift irrigation scheme. He is presently working for the Indo-UK project on Tackling AMR. His current research focuses on Antimicrobial Resistance, Bioremediation, contaminant transport modeling, Hazardous waste management, Treatment of industrial effluents, climate change impact on water resources and hydraulic transients.

Continued...

Life@IITH: I moved to campus with my family just before the few months of the Covid-19 pandemic. We are feeling happy and very much safe even in this pandemic crisis. Further, we didn't even realize the effect of lockdown because of Sampoorna supermarket and the nice people around us. Staff and colleague support during recent floods was unforgettable.

Dr. S. Suriya Prakash: Professor, Department of Civil Engineering

Before joining IIT Hyderabad, he worked as a structural design engineer for little more than two years at Structural Group Inc., Baltimore, USA. Dr Prakash received his PhD from Missouri University of Science and Technology, USA in 2009. Before that, he obtained his M.S degree in Structural Engineering from IIT Madras in 2005. His research interests include the use of advanced composite materials for civil infrastructure, precast systems for affordable housing, and repair and rehabilitation of structures.

Life@IITH: After graduating with my PhD and working in the USA for seven years, I joined at IIT Hyderabad on May 2nd, 2012 as an assistant professor in the department of civil engineering. Its been eight and a half years since I joined. IITH has grown from barren lands in 2012 to a home of state of the art laboratories and modern infrastructure. IITH has provided me with a lot of challenging opportunities to grow as an academician and researcher. I could witness the growth of IIT Hyderabad in garnering high reputation, and it is one of the fastest-growing educational institutes in the country. Being in the middle of a metropolitan city, IITH has given numerous opportunities to do consulting and solve industry challenges and socially relevant problems. IIT Hyderabad is part of history in the making. I am glad I was able to contribute earnestly to the campus development in the initial years. I also served as warden and HCU chair to improve the student life on the campus. I am currently serving as head of the department of civil engineering. Overall, my experience so far has been very positive, joyful and fulfilling.

Dr. Soumya Jana: Professor, Department of Electrical Engineering

Dr. Soumya Jana received B.Tech. (Hons) in the Dept of Electronics & Electrical Communication Engineering from IIT Kharagpur and an M.E. in the Dept of Electrical Communication Engineering from IISc Bangalore. Subsequently, he earned Ph.D. in the Dept of Electrical and Computer Engineering from the University of Illinois at Urbana-Champaign, USA, where he continued as a postdoctoral fellow and a research scientist. He joined the faculty of IIT Hyderabad in 2011.

Areas of his current research include applications of statistical modelling and processing including healthcare, multimedia technologies and environmental monitoring.

Life@IITH: The enormous investment in expanding research and research networking since the founding of IITH continues to bear rich dividends. Greatly benefitted, my collaborative endeavors in the domains of ophthalmology, cardiology, environmental monitoring and 3D content visualization have flourished and matured over the years, and are now helping define the state of the art. I shall continue to apply principles of artificial intelligence to the aforesaid and related fields and hope to remain a team player in realizing the institute's vision of research excellence.



Sep 2020



Sep 2020



Sep 2020

Dr. Suryakumar S.: Professor, Department of Mechanical & Aerospace Engineering

He has done his BTech & MTech (Dual Degree) from IIT Madras in 2005 and PhD from IIT Bombay, soon after which he joined IIT Hyderabad as faculty in 2010. While his current focus is Additive Manufacturing, he shares a broad passion for manufacturing/fabrication domain. His current research interests include Additive Manufacturing of Metallic Objects, particularly large sized; Design for Additive Manufacturing; Medical Applications of AM and Industry 4.0.

Life@IITH: I have done my BTech & MTech (Dual Degree) from IIT Madras in 2005 and PhD from IIT Bombay, soon after which I joined IIT Hyderabad as faculty in 2010. Since then, it has been a wonderful and fulfilling journey at this “young” institute. The good (and bad) of a new institute is that everything has to be done from scratch by its members. This gives a varied experience (be it curriculum to building design to lab setup etc) and also a great sense of fulfilment (of being part of an institution's growth). Beyond my current focus on Additive Manufacturing, I share a broad passion for manufacturing/fabrication domain and consider the success of the manufacturing sector to be pivotal for the sustained economic growth of India. So I am also looking forward to my engagement with Incubation Cell and hope to facilitate the transformation of ideas into successful commercial ventures.



Sep 2020

Dr. Mullapudi Ramya Sri: Assistant Professor, Department of Civil Engineering

She obtained her PhD in the year 2020 from IIT Kharagpur. She is interested in Pavement Materials and Analysis Design and Rehabilitation of Pavements.

Life@IITH: It is very special to work in a fast-growing IIT which has secured first place among the second generation IIT's. IIT Hyderabad offers a very welcoming atmosphere for the newcomers and their ideas. The thrust for the research is high and several opportunities are provided by the institute to develop both department and one's profile.



Sep 2020

Dr. Safvan Palathingal: Assistant Professor, Department of Mechanical and Aerospace Engineering

Prior to joining IITH, he was a Post-Doctoral Researcher in Multidisciplinary and Multiscale Design and Device (M2D2) Laboratory at the Department of Mechanical Engineering, Indian Institute of Science, Bengaluru. He received his Ph.D. from the Indian Institute of Science, Bengaluru, India, and his B. Tech degree from National Institute of Technology, Calicut, India. His research interests are in nonlinear mechanics of slender structures, compliant mechanisms, and optimization.

Life@IITH: It is a privilege to be part of the IITH family. I have received a lot of support and help from the administration throughout this joining phase. Even with the limited interaction imposed by the social distancing norms, help from the MAE department and my colleagues has been critical to getting started. Looking forward to welcoming students back to the campus and happier times.



Sep 2020

Dr. Praveen Meduri: Associate Professor, Department of Chemical Engineering

He has been at IIT Hyderabad since 2014 as an Assistant Professor. Dr. Meduri earned his PhD from University of Louisville, Kentucky, USA in 2010. He worked as an independent researcher at Pacific Northwest National Laboratory, Richland, USA and Pennsylvania State University, Pennsylvania, USA prior to joining IIT Hyderabad. His research spans across the areas of (nano)materials and electrochemistry with a focus on photocatalysis (water splitting, carbon dioxide conversion to value added chemicals, water purification), energy storage (different types of metal-ion batteries) and agriculture (sustainable ammonia production and efficient fertilizer use).

Life@IITH: My experience at IITH for the last six years has been quite rewarding. I had a chance to start my teaching career that has been progressing well so far. IITH gave me an opportunity to establish a world-class energy storage and conversion laboratory with a well-equipped state of the art facilities. One of the most satisfying things as a faculty is to be able to educate high-quality engineers who are the future of this country.



Sep 2020

Dr. Kishalay Mitra: Professor, Department of Chemical Engineering

He joined IIT Hyderabad in 2012 as an Assistant Professor. Dr. Mitra obtained his PhD from IIT Bombay in 2009, MTech from IIT Kanpur in 1997 and BTech from NIT Durgapur in 1995. He brings along with him 15 years of corporate research experience through his exposure at Tata Research Development & Design Centre (TRDDC), Pune and General Electric Global Research, Bangalore. His specialization lies in the interface of optimization and machine learning, where his group (GOKUL) is involved in both theoretical development and implementations of several process systems engineering applications from different domains (energy, climate change, biology, materials etc.). He has been invited as visiting professor to Washington University, St. Louis and University of Washington, Seattle on several occasions. He was the project leader for the pioneering and award winning project of Ministry of Mines and DST, India that implemented the first advanced process control and optimization technology in the mineral processing sector in 2002.

Life@IITH: It is so much feeling to see our own IITH campus coming up in such a big way. Since the beginning when only the green field was allocated to IITH, we are bonded with this campus and now in the evening when it reveals itself in the glittering attire, it takes me back to my good old IIT days of nostalgic campus life.



Sep 2020

Dr. Deepu J. Babu: Professor, Assistant Department of Materials Science and Metallurgical Engineering

He obtained his bachelor's degree in Mechanical Engineering from Kerala University and obtained his master's degree in Metallurgical and Materials Engineering from the Indian Institute of Technology, Madras. He was awarded DAAD IIT-Mastersandwich scholarship to carry out the project work with Prof. Horst Hahn at T. U. Darmstadt Germany. For PhD he joined the research group of Prof. Jörg J. Schneider at T. U. Darmstadt and earned his PhD in 2016 investigating the gas adsorption characteristics of carbon nanomaterials. Prior to joining IITH, he was a postdoctoral researcher in Laboratory of Advanced Separations at École Polytechnique Fédérale de Lausanne (EPFL),

Continued...

Switzerland, where he studied various inorganic membranes for gas separation applications. His main research interest is in nanoporous materials and focuses on developing energy-efficient routes for various separation applications. Deepu is an avid reader, coffee lover, shares a fascination for machines and materials and enjoys traveling.

Life@IITH: Joining as an Assistant Professor at a premier institute in the country is a major transition in one's life. Two weeks of quarantine time at the institute was a blessing in disguise which helped me to be mentally prepared for the new phase in life. Though COVID has seriously hampered social interactions, with whatever little chances I had, I could experience firsthand the positivity and vibrant energy of people at IITH. In almost everyone, you could feel a sense of purpose and a feeling of part of something great in the making. Looking forward to the wonderful journey ahead!



Jul 2020

Mr. Patibandla Srikanth: Assistant Engineer (Civil)

Mr. Patibandla Srikanth completed B.Tech (Civil Engineering) from Koneru Lakshmaiah College of Engineering, Vijayawada having total 14 years of experience in the construction field. Prior to joining to IITH, I worked with Puravankara Limited and Shimizu Corporation. I joined in IITH in 2015 as a Junior Engineer (Civil) and promoted to Assistant Engineer (Civil) in the year 2020.

Life@IITH: IITH is a great place to learn new skills, good friendly working environment and I get to learn a lot from here. It is a good experience to work with CPWD procedures involved in the construction stage. I'm very much thankful for my superiors and colleagues for continuing support and looking forward to learning many more constructions techniques and contribute my best experience to this premier institution.



Jul 2020

Mr. Vinay Kumar Beesa: Assistant Engineer (Civil)

Mr. Vinay Kumar Beesa, Civil Engineer with more than 15 years Industry experience in the construction of High rise buildings, Villas, Project Interiors and Maintenance. Before joining IITH, I was associated with M/s. CBRE South Asia Pvt. Ltd (US-based Project Management Compan), as a Deputy Manager (Civil) and successfully completed significant construction projects. Previous to the M/s CBRE, am associated with M/s Nagarjuna Construction Company International LLC, Oman as a Sr. Site Engineer (Construction of 718 Residential Houses at different location in Quriyat, Sultanate of Oman), M/s. Maytas Infra Limited as a Site Engineer (Construction of Residential Town Ship for Vedanta Aluminum Ltd), M/s. Dhaani Builders and Happy Homes Housings Pvt Ltd.

Life@IITH: I am very privileged to work in IIT Hyderabad as IITH is one among premier institutes of India. Great place to work, with an excellent environment to learn and work on the latest technologies in Construction and maintenance and I'm very much thankful for my superiors and colleagues for continuing support. I am enjoying my responsibilities which have sharpened my skills and leading towards a constructive career and Looking forward to learn so many new constructions techniques and contribute my best experience and knowledge to this premier institution.



Aug 2020

Mr. Muniganti Badrinath: Joint Registrar (Finance & Accounts)

Mr. M. Badrinath, was appointed as Deputy Registrar (Accounts) at IIT Hyderabad in August 2015. Prior to joining IITH, he was working as Assistant Audit Officer in the Office of the Accountant General (Economic & Revenue Sector Audit), Andhra Pradesh, an office under the Comptroller and Auditor General of India (CAG) for a period of ten years. Prior to that, he worked in South Central Railway for 5 years and he has completed 20 years of service under Government of India. Mr. M. Badrinath obtained his Master of Commerce from Osmania University and also obtained CISA (Certified Information Systems Auditor) certification from ISACA (Information Systems Audit and Control Association).

Life@IITH: I joined IITH five years ago and my journey at IITH during the last five years has been a wonderful learning experience. I am really thankful to God for giving me an opportunity to be part of the growth phase of this great Institute. I am excited about the successes that the Institute is going to achieve in the next five years.



Aug 2020

Mr. Altaf Hussain: Assistant Engineer (Electrical)

Mr. Altaf Hussain did Diploma in Electrical Engineering from Govt Polytechnic Guntur AP during 1984-87 and joined Indian Army as a Direct Entry Junior Commissioned Officer (DEJ) on 23.03 1989. Permanently transferred to Military Engineer Service under Ministry of Defence. Served in different Head Quarters / Divisions of MES from 1990 to 2012 and I have 31 years of experience in Planning, Design, Execution and maintenance of works in construction & maintenance field. Looked after Major/Minor/ Maintenance related MES works at DRDO-RCI & DLRL at Hyderabad, DRDO- ADE, GTRE, DARE, Phase-II & Phase-III at Bangalore. Not least, actively participated in the 1999 Kargil war and awarded a Medal "Operation Vijay Star". Retired from Indian Army as subedar Major & Honorary Lieutenant on Sep 2012. Joined IIT Hyderabad as JE(E) on Oct 2012 on the ad-hock basis and got an appointment as JE(E) on permanent rolls on Aug 2015 and promoted to Assistant Engineer (Elect) in Aug 2020.

Life@IITH: Lucky to find an Institution (IITH) which is having a discipline in all respect at par with Indian Defense and living with an excellent working culture.



Sep 2020

Mr. Nadiminti Nagaraju: Assistant Engineer (Electrical)

Mr. Nadiminti Nagaraju completed B.Tech (Electrical and Electronics Engineering) from Jawaharlal Nehru Technological University, Hyderabad had a total of 10 years of experience in Construction and Maintenance, manufacturing industry, Machine building, and CNC Machines concerned with the planning, design, construction, operation, renovation, and maintenance of SPM, PLC and CNC Machines. Also, having experience in Troubleshooting and breakdown maintenance of SPM, CNC Machines, Induction furnaces, Sealed quench furnaces, and maintenance of utilities like DG sets, chillers, compressors, Power transformers, and LT and HT Panels, and safety switchgear. He Joined IIT Hyderabad in the year of 2015 as a Junior Engineer (Electrical) and was promoted to Assistant Engineer (Electrical) in 2020 after 5 years of service at IITH.

Life@IITH: I feel privileged being a part of IITH having an excellent environment to learn and work on the new construction procedures. I am very much thankful to my superiors and colleagues for continuous support. Looking forward to learning many new construction techniques and contribute my best experience and knowledge to this premier institution.



Sep 2020

Mr. Menda Chiranjeevi: Assistant Engineer (Civil)

Mr. Menda Chiranjeevi holds M.Tech (Structural Engineering) from JNT University, Hyderabad having a total 15 years of experience in the construction Industry associated with M/s. L&T Constructions and M/s. TATA Consulting Engineers Limited etc. He Joined in IIT Hyderabad in the year 2015 as a Junior Engineer(Civil) and was promoted to Assistant Engineer (Civil) in 2020 after 5 years of service at IITH.

Life@IITH: It's a great experience to work in IITH with an excellent environment to learn and work on the new construction procedures involved in the construction process. Learned a lot many things from the superiors about the CPWD procedures which are new to us prior to joining IITH. I am very much thankful for my superiors and colleagues for continuing support. Looking forward to learning many new construction techniques and contribute my best experience and knowledge to this premier institution.



Sep 2020

Mr. M. Eswar Reddy: Assistant Registrar (Coordination)

Prior to joining to IITH, He worked as Assistant for 6 years at ICAR-National Bureau of Agricultural Insect Resources, Bengaluru and as Assistant Administrative Officer for around 1 year at ICAR-National Bureau of Soil Survey and Land Use Planning, Regional Centre Bengaluru. He have joined IITH in May 2019 as Section Officer. He has completed B. Tech (Computer Science & Engineering) from JNTU Anantapur, PG Diploma in Personnel Management & Industrial Relations from Annamalai University and MBA (HRM) from GITAM Deemed to be University. He has experience in areas of Purchase & Stores, Establishment, RTI, PFMS, TA, LTC, C&B Sections.

Life@IITH: IIT Hyderabad is a diverse Organization and an excellent place to work at. It is an honour to work at one of the premier Higher Education Institutes of India. It's been a wonderful and outstanding experience working at IITH. The colleagues are helping and highly motivated. It's a blessing to work in the congenial atmosphere like IITH.


भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

IIT Hyderabad congratulates...

Dr. Sai Santosh Kumar Raavi,
(Associate Professor, Dept. of Physics)

for being elected as a

“Senior Member for the 2020 Class of
Optical Society of America”



Dr. Sai Santosh Kumar Raavi
Associate Professor, Dept. of Physics

Mr. Sathya and Ms. Parimala
Ph.D Scholars, Dept. of Electrical Engg.



भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

IIT Hyderabad congratulates...

Mr. Sathya Veera Reddy Dendi (L)
&
Ms. Parimala Kancharla (R)
(PhD Scholars, Dept. of EE)

for being

“Super-winners of the Qualcomm
Innovation Fellowship (QIF) for 2020”




भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

IIT Hyderabad applauds...

Prof. Tarun K. Panda
(Dept. of Chemistry)

for receiving

“CRSI Bronze Medal – 2021”
(Recognition of his contributions to research in
Chemistry)



Prof. Tarun K. Panda,
Dept. of Chemistry

Prof. Pinaki Prasad Bhattacharjee
Dept. of MSME


भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

IIT Hyderabad congratulates...

Professor Pinaki Prasad Bhattacharjee
(Dept. of Materials Science and Metallurgical Engineering)

for being invited to

“Edit a Viewpoint issue in Scripta Materialia on the
emerging field of High Entropy Alloys”



Moments of Pride



Mr. Sai Mahidhar, (Team Leader), Mr. Srihith, Ms. Raniya & Mr. Pramod, Mr. Siddharth & Mr. Venkat
Dept of ES, Dept of CSE & Dept of EE

Dr. Mudrika Khandelwal,
Associate Professor; Dept. of MSME



Prof. Shiv Govind Singh,
Dept. of EE

Mr. Aditya Agrawal, Mr. Dharmgya Sharma
UG, IIT Hyderabad





Dr. Vineeth N Balasubramanian,
HoD – Dept of AI &
Associate Professor, Dept of CSE

Please send your suggestions to:

Public Relations Officer

Public and Corporate Relations Office
Block-A-718/G,

Indian Institute of Technology Hyderabad,
Kandi, Sangareddy - 502285, Telangana, India

Landline: +91 40-2301 6099

Mobile: +91 83310 36099

E Mail: pro [at] iith [dot] ac [dot] in



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Indian Institute of Technology Hyderabad

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